WIN! OVER $10,000 IN DVDs & OTHER PRIZES

atomic

MAXIMUM POWER COMPUTING

Issue 85 | February 2008
Proudly Australian | $8.95
www.atomicmpc.com.au

CASE STUDY

PROTECT YOUR INVESTMENT!

8 of the best luxury cases on the market

Move over NVIDIA?

AMD ATI'S HD3870 AND HD3850 REVIEWED

Ditch Windows!

DISCOVER THE WIDE WORLD OF GAMING ON LINUX

MASS EFFECT

IS BIOWARE LOSING ITS RPG TOUCH?

PLUS

- ***HARDCORE BOARDS:*** THREE MOBOS REVIEWED AND RATED
- ***CODE IT:*** WRITE YOUR OWN REGISTRY TWEAKER
- ***DEVIL MAY CRY 4:*** BEHIND THE SCENES WITH HIROYUKI KOBAYASHI
- ***REMAKING A CLASSIC:*** BLADERUNNER: THE FINAL CUT REVIEWED

aymarket

$AUD8.95 Inc. GST $NZ9.50 Inc. GST

ISSN 1444-8998 02



ALTECH COMPUTERS

WWW.ALTECH.COM.AU

SYD (02) 8831 9999 sales-syd@altech.com.au
MEL (03) 9558 5090 sales-mel@altech.com.au
BRIS (07) 3017 2000 sales-bris@altech.com.au
PER (08) 9242 8822 sales-wa@altech.com.au

NSW	Umart International P/L AusPCMarket	02 9745 0877 02 9646 8000	www.umart.net www.auspcmarket.com.au	Jess World Ptd Ltd	02 9630 9630	www.itestate.com.au
VIC	Scorpion Technology	1300 726 770	www.scorptec.com.au	PC Case Gear	03 9584 7266	www.pccasegear.com
SA	Allneeds Computers	08 8211 8661	www.allneeds.com.au	Getright International	08 8362 0622	www.getright.com.au
TAS	Tasmanian Principal Computers	03 6234 5677	www.tasmanianpc.com.au	Office Equipment Warehouse	03 6272 6272	www.oewcomputer.com
WA	Austin Computer	08 92012788	www.austin.com.au			
QLD	Umart Online	07 3369 3928	www.umart.com.au	Computer Alliance	07 3420 3200	www.computeralliance.com.au



Take the lead with Antec's TruePower Quattro™! With up to 1000 Watts and four 12V outputs, the stylish and compact Quattro efficiently provides stable and reliable power for your powerful processors and multiple graphics cards. The TruePower Quattro™ is designed to meet the 80PLUS® certification which means that it consumes about 33% less energy than many equivalent power supplies, without any reduction in quality performance! All modular cables are sleeved and labeled to give your system a clean and professional look, and the racing stripe paint job adds the extra flair you need to leave everyone else in the dust.
For more information, visit **www.antec.com**.



Antec®
The Power of You



If you're wanting to prance with pixies in the magical forest, then maybe motherboard audio is good enough for you. But if you want the full impact and 3D positional audio of Unreal Tournament 3 then you need Sound Blaster X-Fi®! Once you're armed with the accelerated game play and EAX® effects, your enemies might want to run and hide.

- Gain the edge with faster frame rates through hardware-accelerated audio
- Immerse yourself in headphone surround that sounds like multichannel speakers
- Turn up the realism with EAX® ADVANCED HD™ support
- Restore 3D sound to your games in Windows Vista™ with Creative ALchemy™
  (For more information on ALchemy, please visit www.soundblaster.com/alchemy)



Sound Blaster X-Fi® XtremeGamer sound card

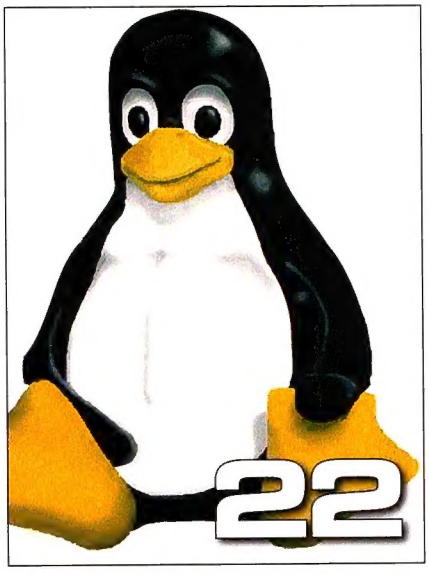
www.au.creative.com

©2007 Creative Technology Ltd. Unreal Tournament 3 © 1998-2007, Epic Games, Inc. Epic, Epic Games, Unreal, Unreal Tournament, the Circle-U logo, and the Unreal Tournament 3 logo are trademarks or registered trademarks of Epic Games, Inc. in the United States of America and elsewhere. MIDWAY and the Midway logo are registered trademarks of Midway Amusement Games, LLC. Used by permission. Distributed under license from Epic Games, Inc. by Midway Home Entertainment Inc. All rights reserved.

CREATIVE®

CONTENTS









FEATURES

Linux gaming 22

Back in the day gaming was some bizarrely spelt four letter word to most linux users, but not any more. Found out what the penguin can do for you.

Head to Head: Luxury PC cases 34

By themselves, PC cases are pretty... well, they don't do much. But they are a crucial part of the PC equation - they protect your gear, you spend a lot of time with them, and they can look quite good. We find the best our of eight top luxury models.

Engine Room: Devil May Cry 4 68

It's time for some gothic action this month, as Logan Booker goes in depth with coat wearing anti-hero Dante, and the very latest in the Devil May Cry series. It's cross platform, but what else has the new episode got in store.

State of the RPG 72

The RPG has come a long way from the old days of Pools of Radiance. Find out what's new, what's been innovated, and where the genre might be going.

REGULARS

LOGIN

Tech Trends 8
Tech and gaming news you need to know.

X-Ray 15
Ashton Mills reports from the front lines.

HARDCORE

Gearbox 32
It must be router month...

Kitlog 58
The best of the best.

The Chippery 60
Josh Collins just can't stop ranting.

Ground Zero 62
Dan Rutter likes his botnets.

Hardware Reviews

Phenom X4 9900	47
Foxconn P35 Mars	48
Abit IP35	50
ASUS 790FX	51
Patriot DDR3-1866 C8	51
AMD ATI HD3870	52
AMD ATI HD3850	52
XFX 8800GTS 512	55
ECS 8800GT custom	55
Silverstone Decathlon	56
Hiper Type R770W	56

GAMEPLAY

Game Reviews

Mass Effect	76
Empire Earth III	78
Pro Evolution Soccer 2008	79

TECHNIQUE

Linux and Xbox 84
Leigh Dyer delves into the mystical realm of the penguin and offers us a couple of handy solutions to the age old problem of making Bill Gates play nicely with Linux.

Create your own registry tweaker 88
Logan Booker breaks out the code and walks us through creating an entire – and very handy – program from scratch.

Atomic.edu, 94
Chris Taylor takes a look at just what it takes to get real work in a real IT company.

Input Output, 96
It's the usual array of tough tech questions, but as always Dan Rutter rises to the occasion.

Fallout, 98
It's just another day in the Spectres for Commander Shepard, and another day in hell for his crew.

EDHEAD

What a... time period

Man... it seems like it was only a short while ago I was writing this piece.

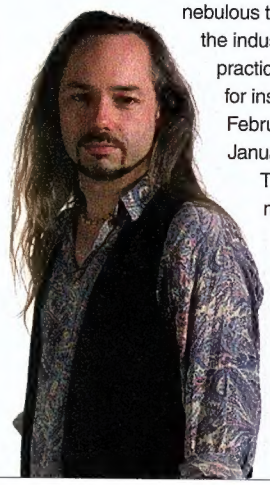
Wait a minute - it was!

Publishing is a funny old business, so I thought it might be an idea to let you in on a few of the hidden secrets. I know a lot of our readers, from the positive feedback we've gotten on the Atomic.edu section, would kill to get into some kind of tech-related job, and there are far worse things to be than a tech journalist.

So, as I was saying, funny old business.

As you can probably imagine, the magazine you are holding in your hands was not written yesterday. Even if you've just received your subscription in the post, it's still a couple of weeks since Josh, David and myself sat back and heaved a massive sigh of relief as we send the last PDF file to the printers.

This time of year makes that kind of lead time a particularly vague and nebulous thing, thanks to the industry-standard practice of publishing, for instance, the February issue in January.



Things get more confusing when, like me, you're sitting here in December writing the copy for that issue. I've lost track of the amount of times I've had to correct people calling this year (technically 2007) 'this year'. This year is now, by the time you read this, last year, and next year is now this year. Does that make sense? My brain hurts.

And, like many publishing companies, we shut down over the Christmas period. Which is kinda great, but also very tough when it means you end up with a seriously short deadline. It really isn't that long since I last sat down to this editorial.

So I'd like to dedicate this column to my main peeps, Josh and David, who have done a phenomenal amount of work in record time. And for all that quantity, there's still a lot of quality.

Take our PC case roundup – eight cases taken apart, poked, prodded, roundly cursed at, and in some cases bled upon; photographed in detail so you can almost feel the rivets and brushed aluminium yourself.

Hardcore is packed with stuff – four graphics cards tested until 3DMark06 begged for a day off, mobos and CPUs pushed to their utmost, and the first fruits of Dave Field's Big Willy experiment (yes, he will kill me for that).

Games... well, playing Mass Effect for a goodly long time was not that much hard work.

Which is why this is such a great and challenging job. For every column that is a struggle to write, there's a little joy to be had as you open a new game or a package of hardware. But trust me, even though for you it's already over, I really am looking forward to that Christmas break!

David Hollingworth
dhollingworth@atomicmpc.com.au

Issue 83 Winners will be announced alongside the issue 84 winners next month.

ATOMICCREW

editorial editorial@atomicmpc.com.au
technical writer **josh collins**
sub editor **james macleod**

creative director **sam grimmer**

design design@atomicmpc.com.au
art director **david west**
product photography **jason busch**

contributors
logan booker, dan rutter, ashton mills, jake carroll, chris taylor, ron prouse, alex gambotto-burke

production
production manager **angela sutherland**
production co-ordinator **ewa grygier**
printed by **webstar**

distributed by
network distribution company
(02) 9282 8777
gordon & gotch new zealand
(09) 625 3005

advertising + marketing
t+61 2 8399 3611 f+61 2 8399 3622
group advertising manager **joanne nichols**
jnichols@haymarketmedia.com.au

business development executive
john kovacevic
jkovacevic@haymarketmedia.com.au
cherry yumul
cyumul@haymarketmedia.com.au
account executive **emily griffiths**
egriffiths@haymarketmedia.com.au

haymarket media
t+61 2 8399 3611 f+61 2 8399 3622
52 victoria street, mcmahons point
nsw 2060

managing director **jeremy vaughan**
publisher **jon westnedge**

Atomic: *Maximum Power Computing is published monthly by Haymarket Media. Company registered in Australia (ABN 61 083 063 914).*

This publication may not be reproduced or transmitted in any form in whole or in part without the written permission of the publisher.

Liability: *While every care has been taken in the preparation of this magazine, the publisher cannot be held responsible for the accuracy of the information herein, or any consequence arising from it. Please note that all review judgements have been made in the context of equipment available to Atomic at time of review.*

Editorial and product submission: *Atomic welcomes all information on new and upgraded products and services for possible editorial coverage. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. The Editor welcomes ideas for articles, preferably sent in outline form, with details of the author's background and a few samples of previously published work. We cannot accept responsibility for unsolicited copy and stress that it may take some time for a reply relating to those submissions to be sent out.*

haymarket

Member of Australian Business & Specialist Publishers Association



ASUS EAH3870

HD 1080p Videos and DX10 Gaming Graphics!

Real-life Visuals with Company of Heroes: Opposing Fronts

Experience high definition graphics like never before with ASUS' new EAH3870/G/HTDI/512M and EAH3850/G/HTDI/256M graphics cards. Supporting the latest generation of AMD Radeon™ HD 3800 chipset, they provide HD Gaming and HD video beyond 1080p quality, and come bundled with the popular DX10 game, Company of Heroes: Opposing Fronts.

Realistic Graphics with Company of Heroes: Opposing Fronts

Enhanced lighting effects, mission persistence, improved AI, enhanced physics and a dynamic weather system provided Company of Heroes: Opposing Fronts with a whopping amount of detail and realism that left me shellshocked. This second part of the highest-rated strategy series reveals moodier graphics and environments, and with the EAH3800 series' powerful graphical performance, gamers will be in for a full visual feast.

Great HD Enjoyment with Advanced Graphical Efficiency

Both graphic cards come with the new 55nm chipset design, and allow users to experience high-end graphical performances while running more efficiently and quietly than before; while DirectX® 10 support provides enhanced 3D graphics and shading effects from the latest games. With PCI Express® 2.0 support, processing power and throughput is effectively doubled in comparison to current AMD PCI Express cards.

Fine-Tuned HD Images with New Splendid Technology

The new ASUS Splendid Video Intelligence Technology utilizes the GPU Pixel Shader to reduce CPU loadings; and allows ASUS' graphics cards to finely adjust Full HD images to deliver vibrant visuals in conditions most favorable to the human eye. This makes watching movies on the PC as good as watching them on top-of-the-line HDTVs. Splendid is also the perfect companion to AMD's Avivo HD technology – providing hardware acceleration for video decoding.



Advertisement

TECHTRENDS

Quenching your thirst for the latest technology and hardware happenings



RIP Auran

After twelve years in the business, a pioneer Australian developer closes its doors...

It was a sad day late last year for the Australian games industry – one of the greats of the local development community, Auran put its Auran Developments company into voluntary liquidation. As we write this, its only a few days after the news broke, and there's still a lot up in the air. But here's the facts.

Auran Developments is the company that actually hires and manages Auran staff, and, subsequently there are now between 40 and 70 top flight aussie developers and related staff out of a job. Auran CEO, Tony Hilliam, has made an announcement that all staff will receive pay for "work to date, their annual leave entitlements, redundancy payments and long service leave". Other blogs, by staff and friends of staff, seemed to disagree, reporting that until the liquidation process is finalised, there's not going to be a lot of money to go around. The cherry on the cake, as it were, as that many staff reported that they have been asked to sign off on paperwork making them Creditors, which does not augur well for a speedy resolution to the payment situation.

Either way, getting laid off mere days before Christmas is no one's idea of a good time.

The interesting thing about this is that Auran, in the shape of Mr Hilliam, has also said that this is not the end of Fury or Trainz, the two big properties that Auran is involved with. At the risk of editorialising, the very idea that Fury is still to be a going concern, after practically being the knife in Auran's back, is incredible. By all accounts, this is a game that was rushed, bloated, and still never quite good enough to make it to market when it did. Statements have been made to the effect that a smaller, more 'agile' dev team can handle future work on the title. We call shenanigans.

You can trace the fall of Auran developments in the string of Fury related announcements that came out in the week before the liquidation announcement. On

SHORT CIRCUITS

Good news, Nvidia fans – new beta ForceWare drivers are out and about. There's nothing of particularly huge importance, but there's a raft of solid improvements across the entertainment board. Most notable: frame drops in Windows Media Player 11 on certain hardware and numerous card-specific fixes for games such as Half Life 2 and Star Wars: Empire at War. We expect the drivers to be stable, but as always, download and install at your own risk. Vista: **http://www.nvidia.com/object/winvista_x86_169.21.html** XP: **http://www.nvidia.com/object/winxp_169.21.html**

Do you love random numbers as much as we do? Of course you do! And there's a new one coming to a Windows Vista install near you. However, do be warned... the thing may well have a super top secret NSA (that's the US National Security Agency, by the way) backdoor in it. Maybe you don't want to rely too much on the Dual_EC-DRBG generator coming in Vista SP1.

day one, the game was discounted by 50 per cent, and a day later it became a free download. Monthly fees were done away with; all to no avail.

On the positive side, forums and blogs all over the country have shown that there's a lot of support for the ex-Auran staff. Offers of jobs at other dev houses, even jobs as teaching staff, appeared within hours and days of the news.

It's a crying shame to see such a flagship developer lose so many staff over what we can only call an unavoidable situation. We at Atomic would like to send our support and sympathy to all those devs and other staff that find themselves unemployed. Good luck.



It's here!

Vista's first service pack is nigh – but **David Hollingworth** is still not convinced.

It's been a funny couple of days to be a watcher of Microsoft and its OS travails. First, we read a very entertaining blog entry (http://dotnet.org.za/codingsanity/) regarding the incredible advantages one could gain by 'upgrading' to Windows XP, and then came the news of that Windows Vista Service Pack 1 was finally available to the public. The former is funny, but not quite true; the latter is very sad, and all too true.

Sure, the thing that many of us were waiting for is finally here; there's a raft of people who have been refusing to even look at Vista until the first Service Pack, so you'd think that this news is good news. It's not, once you consider the effort you have to go through to actually update your install. It appears that not only is Vista not ready to actually, you know, use or do stuff on, but nor is it all that easy to patch.

Release Candidates can be a little iffy, but installing one shouldn't – and never really has been – any different from installing the final pack. Not so for Vista! Vista SP1 (RC) requires two, and maybe three, updates to be applied to Vista before it can itself then be installed. Microsoft promises that those patches will be released as regular updates in the coming months, however. Of particular note is update KB938371; as noted on Microsoft's SP1 page: "This update consists of fixes for several components (including the TrustedInstaller), increases the success rate for installing the service pack and enables the service pack to be uninstalled successfully."

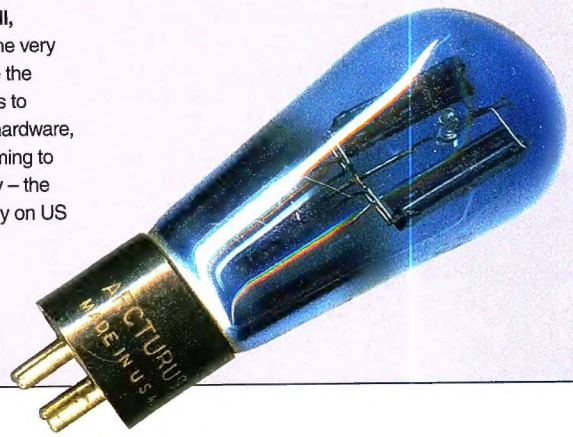
Is it just us or does "increases the success rate" not fill anyone with confidence?

There's also a script that needs to be downloaded and run, that sets a Registry key that will let Windows Update work out if your system is actually eligible. And, of course, each update requires a reboot before the next can be applied.

But, if you are thinking of 'upgrading' to Windows XP, you'll be happy to know that SP3 is coming – and it'll probably be far less painful.

Happy Birthday! If there's a single technology component that deserves a Most Valued Player award, it simply has to be the humble transistor. Back in the dark ages of 1947 by William Shockley, John Bardeen and William Brattain at Bell Laboratories, the transistor was invented to replace clumsy and electricity sucking vacuum tubes – but only slowly. It took a long time for the device to become as easy to manufacture as it is today. Nonetheless, where would we be without them – do you want to try and fit 1.7 billion vacuum tubes on a processor?

Penetration testing. Tiger teams. Hell, Sneakers (great movie, see it now!). The very cutting edge of any security testing are the groups men and women whose job it is to break in and test the limits of people, hardware, and network infrastructure. And it's coming to a TV near you! Well, it will if we're lucky – the new series, Tiger Team, is airing shortly on US channel CourtTV.



SCANNER

Game, industry and online news for the enthusiast



Merger madness

And you thought EA was big! David Hollingworth reports on a monster merger.

The new website says it all: www.activisionblizzard.com. Yes, that's right, at the tail end of last year the games industry witnessed the birth of a new giant as Vivendi and Activision announced a merger, the companies interlocking to become the new Activision Blizzard.

Here are the gritty details. On the 2nd of December Vivendi and Activision announced that they had signed an agreement to combine Activision and Vivendi Games into one entity. The cash side of the thing offers some pretty impressive numbers – Vivendi Games was, for the purpose of the deal, valued at being worth $8.1 billion in US currency. Vivendi sweetened the pot with an additional $1.7 billion, in return for which the company received a 52 per cent stake in the new Activision Blizzard.

That's a staggering total transaction of $18.9billion. At first everyone seemed as happy as a very rich Larry. Activision already had the *Guitar Hero*, *Call of Duty*, and *Tony Hawk* franchises, to name but a few, and Vivendi Games brought the titanically successful *Warcraft* and *Starcraft* franchises to the table. "We are very confident that by combining forces," said René Penisson, Chairman of Vivendi Games, "Activision Blizzard will set the highest standards in quality, reputation and profitability, and will bring together the best creative teams in the industry. The combination of this unique product portfolio with highly professional employees gives us great confidence in the growth prospects for Activision Blizzard."

Stockholders in both companies were already popping the champagne, and even industry observers and veterans where caught up in the heady squee of the moment. The obvious good things to come from the merger seem limitless. *World of Warcraft* ported onto consoles thanks to Activision's market experience; a whole slew of new material for *Guitar Hero*, via the link between Vivendi and Universal Music; crazy crossovers would even be possible, like a *Call of Duty* game set in *Starcraft*'s wartorn future... and of course the general melding of creative minds from two the most successful publishers in the gaming universe.

The daydreaming lasted less than 24 hours. On December the 3rd, Activision CEO Robert Kotick made the following statement in a conference call with State-side journalists: "...expect virtually every one of those properties (meaning any of Activision's big money-making franchises) will be exploited on an annual or close to annual basis."

Not refreshed, not developed, not released, not re-launched... exploited. If ever there were a word that could leave a dirty taste in our mouths, that's it. *Call of Duty 4* is an excellent game, mainly because of the brave decision to ditch the WW2 setting and strike out in a new direction; will a 12 month production cycle on *CoD5* – which has begun development, by the way – allow a similar level of freedom? We as gamers know what happens when you push out games like that; all you have to do is look at EA's sports games publishing model to see what may well be in store for some of Activision's best.

At least things seem rosier on the Blizzard side of the new equation. Spokespeople for the company have already stated quite frankly that they will not be pushing development schedules, nor compromising any of their big upcoming releases.

Thank the gaming heavens for small mercies.

> **"Not refreshed, not developed, not released, not re-launched... exploited."**

SHORT CIRCUITS

Fans of Gordon Freeman, rejoice! Valve's Doug Lombardi has confirmed – kinda-sorta – that there is life in the Half Life franchise beyond *Half Life 2: Episode Three*. The full quote, in an online interview at StuffWeLike.com, runs thusly: "We haven't announced anything specific, but *Half-Life* won't end at *Episode Three* - hang on to your crowbars!" Does this mean there'll be more episodic content? Is *Half Life 3* around the corner? Either way, it's nice to know that a beloved franchise has got a lot more life in it.

And speaking of more life in Valve products, fans of *Team Fortress 2* can get in on some rejoicing action as well, following the announcement that new maps and a gameplay update is on the way. There's no hard count of the maps, but a Valve software engineer has confirmed that maps will be released to the PC community as they are ready, and packaged in a larger download later for 360 players. The promised update will likely deal with some common exploits, but it's unclear if it will cover both 360 and PC. Still, new maps for one of the most fun games of year? All gravy, baby.

What the hell, let's get some more rejoicing out of the way. This time, we offer good news to *Bioshock* fans! A recent update for both 360 and PC offers new UI options, in shape of a widescreen viewing option, and a mess of new plasmids and gene tonics. There's also a new Achievement exclusive to 360 players – beat the game on Hard without dying and you'll earn Brass Balls and 100 points.

Dell recommends Windows Vista® Home Premium.

SHOW NO MERCY

XPS isn't about winning. It's about out-right domination. So build yours with the kind of epic power that lets you pwn nOObs like a pro.

intel Core™ 2 Quad inside™

Quad-core. Unmatched.



XPS M1730

Outflank your opponents with the world's first notebook that can be built with an AGEIA® Physx™ Processor and the latest next-gen NVIDIA® SLI technology. You'll see every hair, gust of wind and spec of dust react as though it were real and live the game while others merely play. And for a truly unfair advantage, the XPS M1730 also comes with an LCD GamePanel™ display so you can view game and system stats in real time.

XPS

XPS M1730
STARTING FROM
$2,999

XPS 720

The power you've always dreamed about is here. Built on the NVIDIA® nForce™ 680i SLI chipset, the XPS 720 lets you load your system with dual high-performance NVIDIA® graphics cards, giving you all the juice you need for a full-throttle graphics experience. Then combine that with Blu-ray Disc and the AGEIA® PhysX™ Accelerator to create a PC that can only be described as a living monster.



XPS

XPS 720
STARTING FROM
$2,599

WWW.DELL.COM.AU/XPS | 1300 734 949
OR VISIT A DELL KIOSK

NSW : Westfield Bondi Junction • Chatswood • Parramatta • Miranda and Warringah Mall
QLD : Westfield Carindale • Chermside
VIC : Westfield Fountain Gate • Southlands

DELL™

YOURS IS HERE

*DELL'S TERMS & CONDITIONS: apply to all sales available on request or at "Terms and Conditions of Sale" located at the bottom of our homepage at www.dell.com.au **GOODS BY DELIVERY ONLY:** Goods by delivery only direct from the factory. We have no retail outlets. Dell Australia Pty Limited (ABN 46 003 855 561) is located at Unit 3, 14 Aquatic Drive, Frenchs Forest NSW 2086. **ONLINE PRICING:** Prices advertised online include delivery fees unless otherwise stated that delivery is free. For this reason prices are presented differently in the Dell online store. Goods are supplied by delivery only. Delivery fees start at $49. **MISTAKES:** While all efforts are made to check pricing and other errors, inadvertent errors do occur from time to time and Dell reserves the right to decline orders arising from such errors. **PRODUCT PERFORMANCE:** We often quote speeds and other performance data (such as printer speed or processor speeds). Please note that these quotes are only for comparative purposes and your actual speed or other performance can vary with a host of factors, including the other equipment or telephone line used. **TRADEMARKS:** Celeron, Celeron Inside, Centrino, Centrino Logo, Core Inside, Intel, Intel Logo, Intel Core, Intel Inside, Intel Inside Logo, Intel Viiv, Intel vPro, Itanium, Itanium Inside, Pentium, Pentium Inside, Xeon and Xeon Inside are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Other trademarks and trade names may be used in this advertisement to refer to either the entity claiming the marks and names or their product. Dell Inc. disclaims any proprietary interest in trademarks and names. All rights reserved. **FURTHER INFORMATION:** For more important information about our products and services go to www.dell.com.au/important_information **COPYRIGHT:** © 2008 Dell Inc. All rights reserved.

DELM5475/Q4/WK10/ATOMIC

SCANNER

Game, industry and online news for the enthusiast

Wow, that's a lotta... WoW.

Do you share your addiction with nine million other WoW players? David Hollingworth thinks you'll love these toys...



We're not above admitting that at one time, we might have had a small *WoW* addiction. It's okay, though, we got better. I mean, we can give up any time we want, right? Especially when there's *Lord of the Rings Online* to fill the void... but for those still in Blizz- I mean, Activision Blizzard's clutches, there's a great new toy on the US market.

Dell's very serious about pushing its geek cred, and nothing says geek cred like a personalised *World of Warcraft* laptop. It's not available locally, sadly, but it's a good enough machine that switching citizenship might just be a worthwhile sacrifice – the *WoW* laptop is essentially an XPS M1730 (as reviewed last issue), which comes in either Horde or Alliance versions, *WoW* and *The Burning Crusade* (plus all patches) pre-installed, custom wallpaper and screensavers, and a whole mess more.

We've spoken to Dell Australia, and as much as we whine at them, it doesn't look like the laptop will be released locally. However, there is one neat way to deal with your grief.

There's a new *WoW* cottage industry – personalised figurines, based off of your actual character and their equipment. FigurePrints uses rapid prototyping technology to take your virtual character and turn it into a handsome, glass-cased statuette. Rapid prototyping is pretty damn cool as it is, and this is just one more cool application. Come on, can you think of a better way to get your *WoW*-addicted girlfriend's attention?



Through the roof

Who said the industry is in trouble – game sales skyrocketed at 2007 year's end. David Hollingworth reports.

2007 has been a stellar year for the games industry, and while, technically, it's still not over as we write this issue, it's already brought in more dosh than 2006.

In fact, in a study released by US market research company NPD, it was calculated that even if 2007 ended on December 1st, games and games technology sales would still be up five per cent on 2006.

Final figures for the year, once the dust has settled from crazy Christmas sales, are expected to top $18 billion in the US alone.

The big winner in the sucking-money-from-our-wallets stakes is Nintendo and its gaming for everyone console, the Wii. Nearly a million units were sold in November, and the Nintendo DS was even more popular, hitting the magic 1.5 million unit mark. *Super Mario Galaxy* was a hairsbreadth from being the biggest selling game of the year, and *Guitar Hero 3* on Wii helped fill out Nintendo's coffers.

Sony, however, is not looking so crash hot. Sony machines enjoyed a serious month sales increase, but still couldn't overtake Nintendo or Microsoft – all three Sony platforms hovered around the 500,000 unit mark. The only PS3 exclusive game, *Uncharted: Drake's Fortune* enjoyed great reviews but slow sales, and titles like *Assassin's Creed* and *Call of Duty 4* sold much, much better with their 360 versions.

Speaking of which, the 360 sold nearly 800,000 units, and 360 titles took out four of the top ten game sales slots. *Call of Duty 4*, in particular, did very well – despite only being on sale for a tad over a month, it topped number one.

That's a lot of headshots.

PIPELINE



Prototype

TBA

Imagine the freeform play style of *Grand Theft Auto*, mix in a protagonist who's been genetically enhanced with a myriad of shape shifting and superhuman abilities and you're awfully close to the heart of *Prototype*. Let loose in a fully interactive and populated New York City, you play Alex Mercer – the *Prototype* – who can assume the form, memories and skills of others while able to transform parts of his body into biological weapons. Sexy, yes? *Prototype* is shaping up to be a playability feast with co-op multiplayer and a 3D engine that will effortlessly deliver stunning metamorphic visuals.

[Platform] PC, PS3, Xbox 360
[Developer] Radical Entertainment
[Publisher] Sierra
[Web] www.prototypegame.com



Dead Space

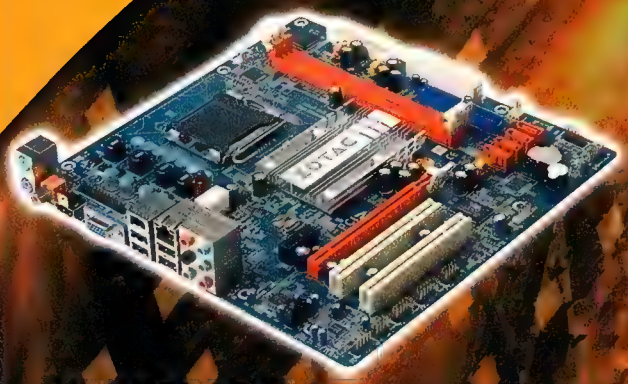
Mid 2008

EA might be more well known for churning out sports titles than actually breaking any real ground these days, but *Dead Space* looks to turn that sport-sick frown upside down. Placing you in the shoes (and heavy space suit) of Isaac Clarke, an engineer aboard a deep space mining vessel – nervous yet? – *Dead Space* quickly subjects you to a raft of horrifying events. Riffing on movie classics like *Alien* and John Carpenter's *The Thing*, and bearing not a small resemblance to the recent hit *BioShock*, *Dead Space* adds some nifty zero-gee sequences into the horror mix; it looks to raise the bar to truly bloody levels in terms of graphics too. In other words, we can't wait.

[Platform] TBC
[Developer] EA Redwood Shores
[Publisher] EA
[Web] www.ea.com/deadspace

ZOTAC®

It's Time to Play



Zotac N73U-Supreme
Nvidia® GeForce 7150/ Nvidia® nForce 630i

- Graphic engine clock 630MHz
- Onboard Giga lan
- VGA and HDMI ports



GeForce 8800 GTS 512MB AMP! EDITION

- Engine clock: 678MHz
- Memory clock: 1944MHz
- Shader Clock: 1728MHz
- Memory interface: 256bit
- 512MB DDR3 Frame Buffer Size



GeForce 8800 GT 512MB AMP! EDITION

- Engine clock: 700MHz
- Memory clock: 2000MHz
- Shader Clock: 1700MHz
- Memory interface: 256bit
- 512MB DDR3 Frame Buffer Size

GRAPHICS BY NVIDIA

Award:

www.zotac.com

Distributor:

INGRAM MICRO®

Tel: 1300 651 124 Fax: 02 9381 6290

www.ingrammicro.com.au

Ocean Office Automation Pty Ltd.

Sydney: 02 97486788 Brisbane: 07 3357 3388

RAZER

Lachesis™

high precision 3G laser gaming mouse



Main Entry: Lachesis Muta Muta
Function: noun
Pronunciation: /ˈlak-ə-səs ˈmü-ta ˈmü-ta/
a: The largest pit viper in the world
b: *Latin.* Bringer of silent death

bringer of silent death

Equipped with the revolutionary 4000dpi Razer Precision 3G Laser™ sensor, the Razer Lachesis™ gaming mouse takes on the same lethal traits as its namesake that will send shivers down your enemies' spines. Victory beckons – move in for the kill.

For full product range and pricing contact Audion Australia



Razer Diamondback™ 3G



Razer Lycosa™



Razer Piranha™

Audion Australia
1300 300 364
www.audion-mm.com

powered by 3G Laser sensor 4000dpi

www.razerzone.com

FOR GAMERS. BY GAMERS.™

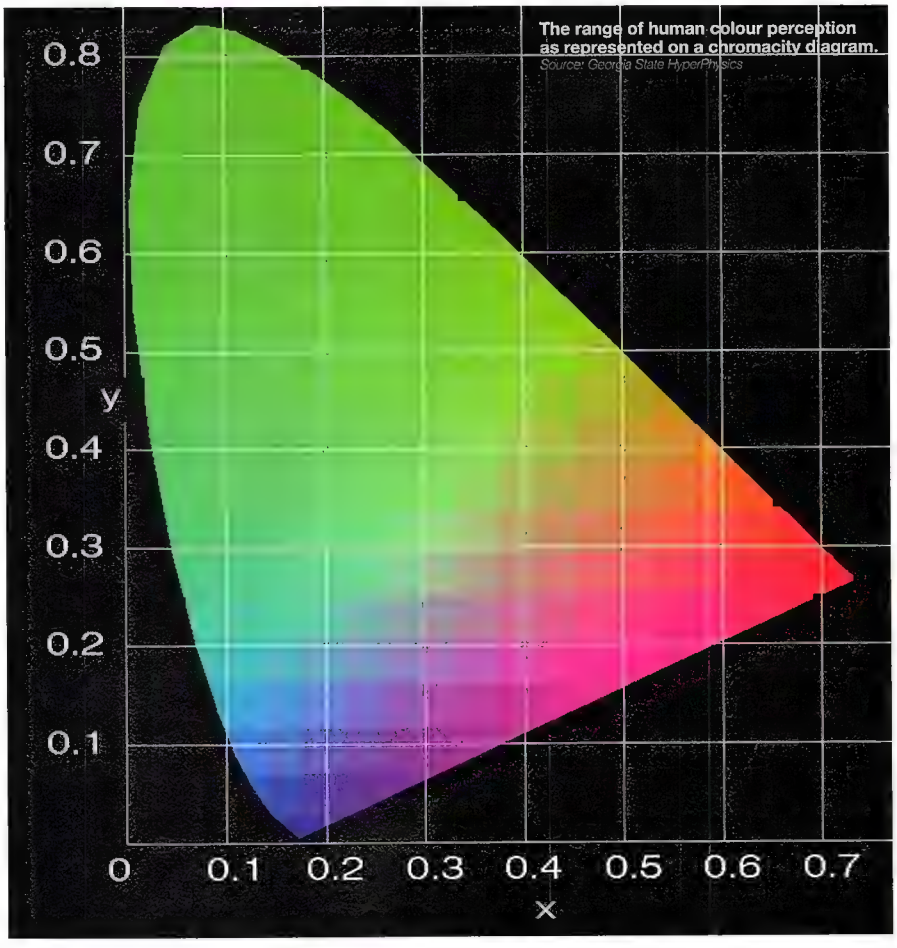
© 2007 All Rights Reserved. Razer USA Ltd and affiliated companies. Actual products may differ from pictures. Information correct at time of printing.



The truth about frames

Ashton Mills keeps his labcoat on again this month, this time taking a scientific approach to frame-rate.

In this X-Ray we're going to put to rest the age old argument of "30fps is all you can see". Much like Gates' "640k should be enough for everyone" statement (misappropriated as it is), the debate over just what frames per second you need on screen for a game to seem 'smooth' is full of mis-information. If you're in the camp that believes 30fps is the limit of human vision, stop reading now as we don't want to break your fragile world. And speaking of vision, the human eye is where we'll start this journey.



The range of human colour perception as represented on a chromacity diagram.
Source: Georgia State HyperPhysics

Analogue

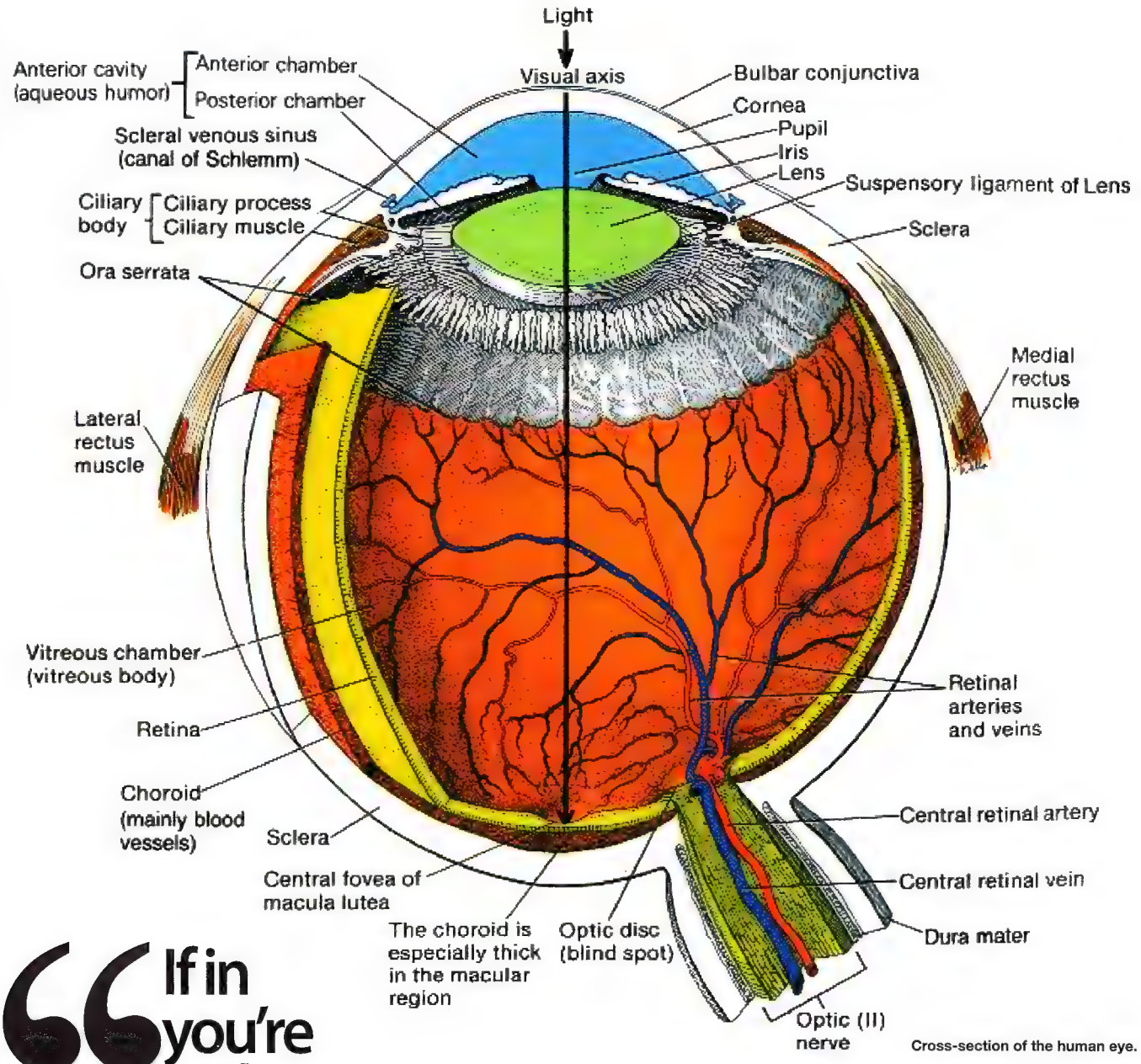
The human eye is, as they say, a rather spiffy device. It's capable of discerning an incredible range of colours and intensities of light, can dynamically adjust the amount of light that enters, and can focus on objects near and far with ease. It's also an analogue device – no frames here, just constant signalling. We really perceive the world as a constant stream, and the annotation of frames per second we aspire to in games is all about duplicating this experience by rendering images so fast that the human eye can't discern where one frame ends and another starts.

And just where is that boundary?

Colour and light

First it helps to understand a little about the human eye.

As light is focused on the retina it bathes two unique types of cells – *rods* and *cones*. Rods react to light intensity, but don't react as fast as cones. It's the rods that allow you to see in the dark with



Cross-section of the human eye.

"If in you're in the camp that believes 30 fps is the limit of human vision, stop reading now."

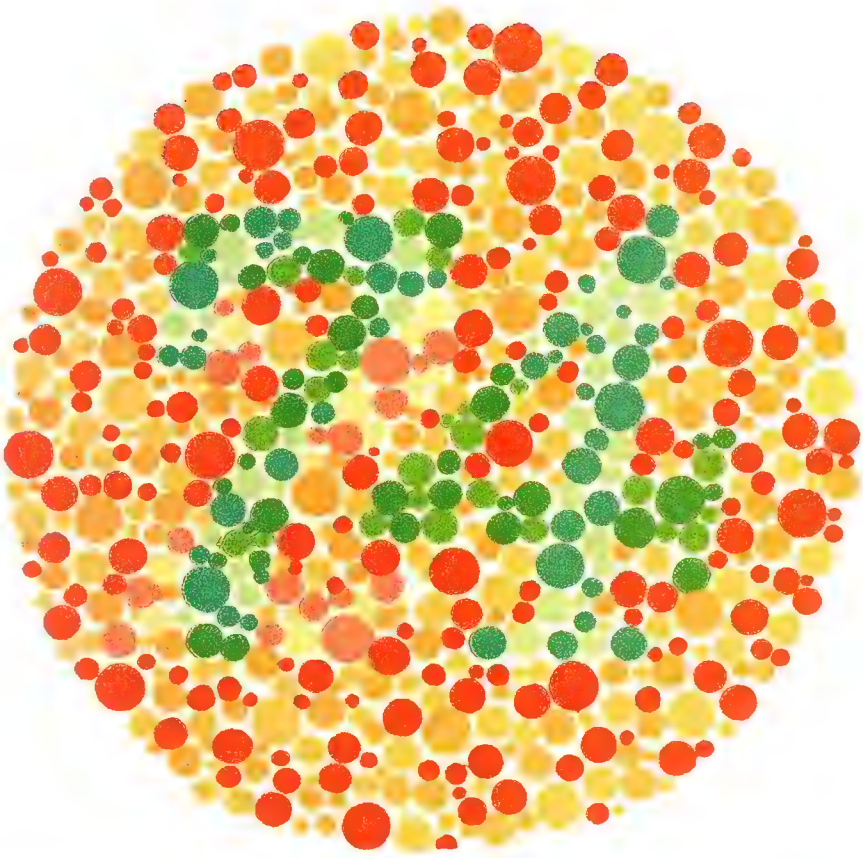
minimal light. However, they can't detect the wavelengths of colour, which is why objects lose their colour at night.

Cones don't work particularly well in the dark, but do detect colour very well. There are three types of cones, each attuned to the red, green, and blue spectrums – aka RGB. Actually it's not quite that simple – as analogue devices and working in tandem, the cones detect the *properties* of colour in terms of hue, saturation, and brightness but it'll suffice for our purposes here.

There are many more rods in your retina than cones – some 100 million rods to six odd million cones – and the cones are concentrated in a small area called the *macula*. The distribution for the light spectrum isn't even, either. Generally, we're able to perceive the green range better than red, and red better than blue. Indeed, there are more cones tailored to registering these as a result. It's hard to imagine, but if our eyes could receive all wavelengths equally, a candle flame would appear red and not yellow.

Brightness and contrast

So what's this got to do with frames? Keeping in mind the purpose of cones and rods, there's another factor to consider – how quickly they respond to changes in light. Attuned to light as we are, it's been established that the human eye can distinguish a change in the presence and intensity of light far more than it can of the absence of light. Said another way, light can create an afterimage in the eye, much like you get if someone rudely shines a torch in your eyes (more on this later). It's possible for you to still discern an intermittent black background over a white one at a rate of 1/50th of a second, or 50Hz. Approaching 100Hz, it becomes all but impossible. However,



One of the images from the Ishihara colour blindness tests – people with reduced cone efficiencies don't see the number.

distinguishing a white background over a black one can be easily noticed at 100Hz, and even as high as 200Hz. A much vaunted test the US Army once conducted found that pilots could distinguish the image of a plane at up to 220Hz, or 1/220th of a second.

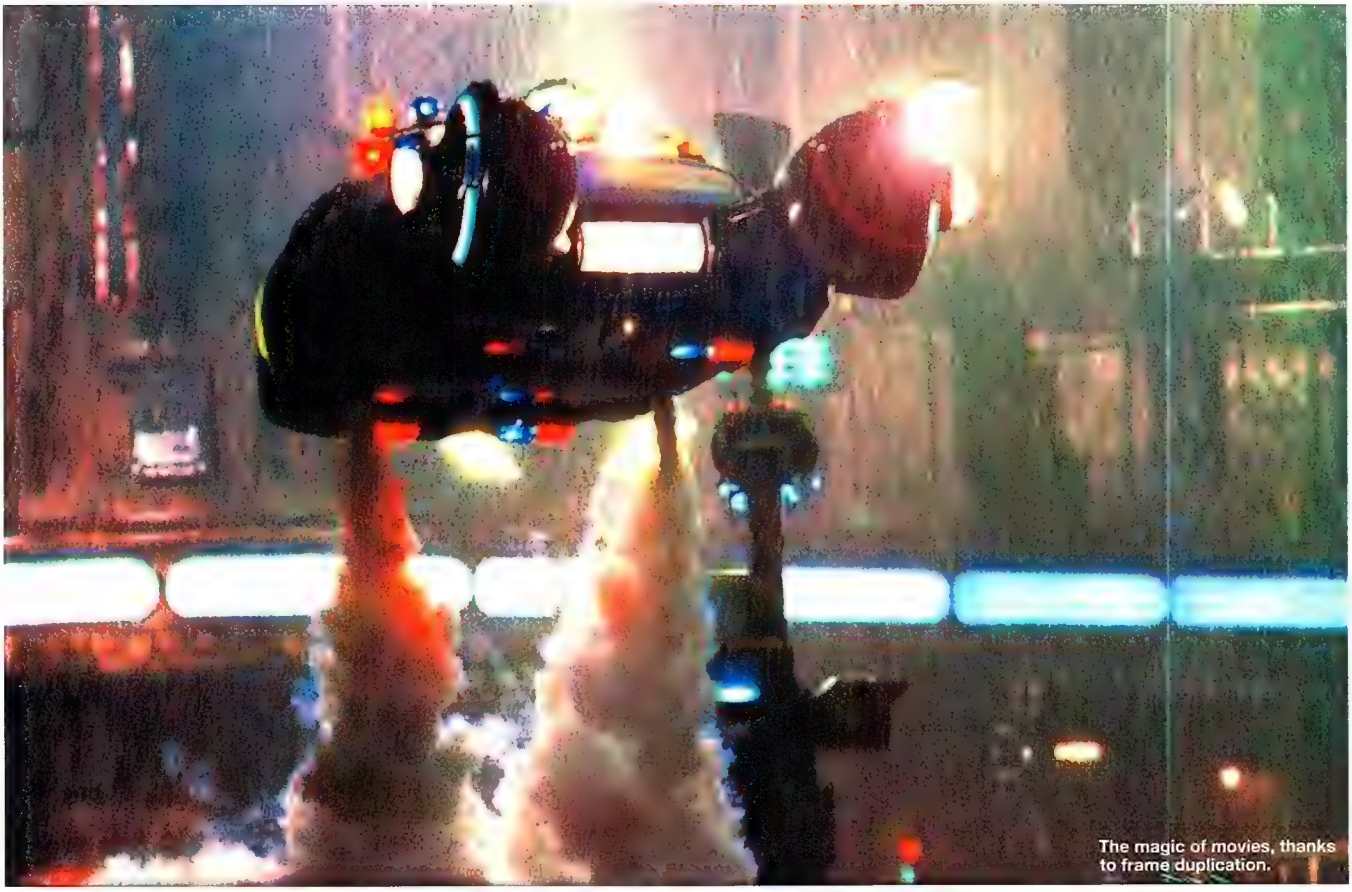
Because the human eye is capable of adjusting to lighting conditions via the iris and chemical changes in the retina, the full dynamic contrast ratio of our eyes is estimated to be about 1000000:1.

Keeping in mind the human visual system is analogue, this is only a guide to the limits of the chemical reactions and brain processing that goes on constantly. It does show, however, that between light and dark we can distinguish changes as quickly as up to 200Hz.

Flicker fusion

This ability to detect to a change in light is called the *flicker fusion threshold*. In short it's the rate at which a flickering light becomes indistinguishable from a solid one to the human eye. Using the example above, if we can pick up a bright flashing light once every 200th of a second, how fast would it need to flash before we considered it to be permanently on (even if it actually isn't)?

The answer depends on the intensity of the light, the health of the individual (fatigue weakens our ability), where the light is focused on the retina and more. Ever notice how a seemingly solid CRT screen face on seems to flicker when you look at it out the corner of your eye? It's the outskirts of your



The magic of movies, thanks to frame duplication.



One game where higher than 30fps is largely a dream.

> **"An LCD, naturally, allows for perfectly solid images as the screen isn't raster-ised."**

retina where more of the fast light detecting rods are concentrated.

Overall, though, the average person starts to find a pulsing light indistinguishable from a solid one at around 75Hz. Everyone is different however, and some people can still pick up a slight flickering at 75Hz. As you approach 100Hz, pretty much everyone sees a solid light.

If you think back to your CRT days, before the wonders of LCD monitors, you'll remember that sitting at work with 60Hz refresh rate would eventually give you a headache, and you *swore* you could see slight flickering of the screen. Those who took the time to set their refresh rates to 75Hz or more (preferably 100Hz) would appreciate a solid image, and more importantly one that didn't give them a headache.

The game is a little different with LCDs of course, as their Achilies heel is *response rate* not *refresh rate*, and these are entirely different things. An LCD, naturally, allows for perfectly solid images as the screen isn't rasterised as with a CRT; pixels are either perfectly on or off.

That said, they still sport a 'refresh rate' of 60hz, which you'll see represented in your video drivers for LCDs. Speaking of which – now we've determined that the human eye and brain can discern flickering up to at least 75Hz, and can notice a single instance of light up to 200Hz, what's this all mean for the great FPS debate?

Movies and TVs

First, let's look at an anomaly. The astute among you might be saying "Okay, that all makes sense. But why then do movies which run at 24fps and TV which can run up to 30fps look seamless rather than jittery like a game would be at these rates?"

Good question, and it's answered in two forms: display mechanism, and the persistence of vision.

Movies, for example, have been traditionally recorded at 24fps (and we won't go into why here). When displayed by the projector, to stop you seeing the film rolling the shutter interrupts the light between frames, but as we've established these black moments would be quite visible at 24fps. So what's the solution? Each frame is repeated three times, and the light interrupted three times. This creates a persistence of each frame at an equivalent 72fps, which just happens to be close to the flicker fusion threshold for the majority of the population, which is 75fps.

But why is our brain fooled into seeing a seamless image? The answer is *persistence of vision*. Going back to the example of shining a torch in your eyes, when light is interpreted to your brain by the cones and rods it's not a binary operation, it's a chemical reaction. Both are sensitive to light, and the greater the intensity the greater the effect and the longer before they adjust to the next change in intensity. This is why when you turn a light off at night it takes a number of minutes for your eyes to adapt – you don't get instant night vision. When it comes to watching film, those repeated frames are still transmitting information to your brain even as the light is interrupted by the shutter, and as it happens faster than your eyes can adjust the illusion of a constant image is created.

TV is a little different, but with a similar principle. Depending on the bandwidth, though traditionally

25 or 30Hz (PAL and NTSC respectively) before digital TV, each frame is rendered in two passes using fields (odd and even numbered lines), again relying on persistence of vision to ultimately create an effective frequency of 50 and 60fps. This is why 100Hz TVs in Australia worked so well – by literally repeating frames, much like a cinema, these displays had an effective frequency of 100fps, double the 50fps we have for PAL (for which you can sometimes see flicker) and creating very solid images on screen.

But film and TV is not your CRT or LCD monitor. These devices *can* produce constant full frame updates in excess of 100Hz (CRTs) and 60Hz (LCDs) – and you notice the difference between frames because, of course, your flicker fusion threshold is at least 75Hz.

The truth about FPS

So back to the great debate; it's time to lay the smack down: 30fps isn't enough, that's clear. Even 60fps isn't ideal, but it's a lot better. And yes, all those *Counter-Strike* freaks denying LCDs and sticking to their CRTs to pump frames at 100fps or more and saying they can see a difference – they're not lying. In fact, this is still one area where the CRT rules the roost over LCDs.

Since LCDs default to 60Hz, the maximum frames they can attempt to display is 60fps. As the flicker fusion threshold is around 75fps for the majority of the population, this still isn't as seamless an experience as it could be.

Of course, we're talking full frames here, which means vsync on. If you turn vsync off, yes, you'll be able to break past that 60fps, but as you know you get tearing; but it's not the display doing this. With vsync off your card is still synchronised with the display at 60Hz, only now it's displaying the contents of its buffer whether the next frame has finished rendering into it or not, so you get a buffer filled with one frame and partly rendered with the next, resulting in tearing. When you use vsync, the buffer is only emptied when the frame is complete, but since it still needs to synchronise with the display, it – like film – can repeat frames while it waits. The display is still 60Hz, even if only 30fps is being managed at the time (the alternative would be to blank the screen, and you'd notice that more).

Conclusion

The final note to say about frames per second is this: your brain is hella smart, and it's rather good at picking up discrepancies. In addition to aiming for well above 30fps in games for a better experience, it's just as important to get constant, not fluctuating, frames. It's better to run at a constant 30fps than hovering at 20-40fps – the brain notices the lack of continuity more than a consistent frame rate. This is another argument to use vsync – it'll keep your frames much more consistent and provide a smoother display, even if the maximal framerate is less than having vsync disabled. Just remember to enable triple buffering as well.

This is also the reason games are now capping frame rates – like *Call of Duty 4* on the PC capped at 60fps, and *Halo* on the Xbox at 30 fps (and now you know why, with TVs as the popular display device for the Xbox).

So next time someone insists the human eye can't notice anything higher than 30fps, laugh a little and then point them to this piece.

GIRLS HAVE IT GOOD

Sorry guys but, in more ways than one, girls are the better sex and not just because they're the fairer one. Women not only generally live longer than men, but they also have a greater sense of smell and can discern a wider range of colours. Indeed, some women have a fourth type of cone – one that lies in the red to orange spectrum. The colour range for these women, called [i]tetrachromats[/i], is an order of magnitude bigger than the rest of us – those with just three types of cones, aka [i]trichromats[/i]. Now you know why your girlfriend picks on you when your clothes don't match, because they [i]don't[/i]! And why is it just for girls? Because the gene for the fourth cone is only found in X chromosones, and lads, you're Y.



30 frames per second is as good as it gets in Halo. Still looks good, though, doesn't it?

TECHNICA OBSCURA

The big picture behind technology and the world around us



A friend in need

Ashton Mills asks the question of the ages...Whatever happened to co-op?

A short while ago there was a nostalgic piece on Next-Gen about the making of *System Shock 2*, which, understandably, has been in the minds of many since the release of *Bioshock*. In it, Ken Levine talks about the challenges of making the game and revealed how the multiplayer co-op functionality was tacked on after release.

And yet every time someone mentions co-op play as a gaming mechanism, *System Shock 2* is the first game – the best game – that comes to mind.

Why? Because even as a tacked-on afterthought, its teamwork functionality is still one of the most innovative and brilliantly implemented co-op games to date. You could play the single player campaign alone or with your friends in co-op mode, and it worked equally well for both as an awesome experience.

All those years ago I finished the game twice – once in single player, and once co-op with a mate. In co-op mode we could more deeply specialise in the classes on offer, which made even playing the same campaign new again. And it was some the most fun I've ever had in a game, period.

Now I ask you – can you name the number of games released in recent years that have co-op play? Hrm...

For some reason the word 'multiplayer' has been brutally mutated to mean 'deathmatch'. Indeed, when a game includes 'multiplayer' capability the single player campaign is usually tossed aside for generic deathmatch maps, with banal goals and a tepid excuse to have lots of people running around shooting each other. It's fun, for about ten minutes, and then it just gets boring.

Somewhere along the lines developers have forgotten that multiplayer is not synonymous with deathmatch, or even team deathmatch – it has more than one component, more than one facet. You could say co-op just isn't a popular mode, given every one plays deathmatch based multiplayer games, but then again name the number of games released with a co-op mode – it's chicken and egg. No one's playing it because no one is offering it. That, and since you rarely need central servers it's not exactly easy to tally usage. A pity, because that might make a mighty strong argument for sales figures.

The fact that most games extend their deathmatch multiplayer modes through a wider variety of maps, upgradeable skills or abilities, or the competitiveness of a ladder shows that this form of multiplayer gaming is blatantly shallow. It needs these in order to be interesting at all.

I should be clear – I love a good deathmatch game as much as the next pasty faced geek, but even here I tend to choose games that involve teamwork. I just find them more rewarding. I absolutely loved *Frontline Force* (a *Half-Life* mod) many years ago for its strong emphasis on teamwork and found it much more fun than *Counter-Strike*. And I still play *Natural Selection*, which is about as teamwork-focused as they come, and spent a rather large amount of my time in an Australian *NS* clan (which ultimately topped the AU ladders, and showed the yanks a thing or two!). Perhaps appropriately, there's a nod to SHODAN (uber villian from *System Shock 1 & 2*) in the *NS* map 'ns_nothing'.

> **“Developers have forgotten that multiplayer is not synonymous with deathmatch.”**

But I digress – co-op, for me, is where it's at. There is no more rewarding gameplay than the shared experience of beating the main game campaign through teamwork with your mates.

Is it hard to do? No – *System Shock 2* did it brilliantly, and I'd buy it again just to complete it with a friend. Is it a matter of putting a value on development resources? Perhaps – so I'm here to speak for all the co-op gamers: we're here, we're hungry, and we'll happily spend cash on a game that puts co-op first – even *before* a single player campaign. So to the big beefy game publishers: make us a game, already!



Contrary to popular opinion, Ashton Mills is a cuddly and rather nice guy. He's not always angry.

amills@atomicmpc.com.au

TRIPLE THREAT



Get the power of three today!

One is good. Two is better. But three is the magic number when it comes to creating the ultimate gaming experience. With the XFX 780i nForce® SLI™ motherboard you can punch your rig's performance with explosive 3-way SLI technology that creates a truly unique and unmatched gaming experience. Take control of every outcome with the real-time component monitoring and tuning features of the first-ever ESA-certified platform. But easy in the turns, because this is a full-throttle DirectX® production.

All you need is an XFX 780i nForce® SLI™ motherboard.
But you better hurry, because there's already a line forming...



Supports up to three graphics cards in SLI configuration
(3-way SLI requires GeForce 8800 GTX or GeForce 8800 Ultra)

Multimedia Technology
Authorized Distributer
Multimedia Technology
☎ 1300 650 203
✉ sales@mmt.com.au

Check out our platinum resellers

VIC
Scorpion Technology
☎ 1300 726 770
Computer & Parts Land
☎ 03 8542 8688
Centrecom Computers
☎ 1300 133 165
ComputerWorld
☎ 1300 133 132

NSW
EYO Technologies
☎ 02 9790 8822
TX Computers
☎ 02 9262 1588
Online Computers
☎ 02 9211 0898
ComputerWorld
☎ 1300 133 132

QLD
Umart Online
☎ 07 3369 3928
Game Dude
☎ 07 3387 1500
PC Shopper
☎ 07 3397 0777

WA
PLE Computers
☎ 08 9309 4771
Trinix Australia
☎ 08 9350 1600

NATIONAL
Harris Technology
☎ 1300 13 9999

SA
A&R Computers
☎ 08 8351 1200

XFX
play hard.
www.XFXforce.com

Playing the Penguin

Leigh Dyer takes a look at how far gaming's come on the *other* OS...

The Linux world has a long history of fending for itself, since so few Windows applications make their way to the OS. For day-to-day desktop tasks, it does very well: there's no Internet Explorer, Outlook or Word, but Linux does have excellent alternatives like Firefox, Thunderbird, and OpenOffice, and the same can be said for nearly every major category of software.

Games are a different beast though: they're not tools that you use time and again, but sweet treats that are quickly consumed by the gaming masses before they move on to the next big thing. The iterative approach of open-source development just can't afford to produce throw-away software in the same way.

Despite that, gaming on Linux is far from dead. A handful of developers still release Linux versions of their games, and there are some open-source games that are great fun despite their budgetary constraints. It can even run some Windows games directly, through the magic of Wine. Get ready to get your game on...

Commercial games

They're few and far between, but some new-release commercial games from the Windows world do make their way to Linux, typically through downloadable Linux binaries that work with the data files from the Windows release. iD Software has used this approach for years, porting all of its titles since the days of *Wolf3D* and *Doom*. Some third-party titles that make use of iD engines have received similar ports, such as Raven's *Quake 4* (available just two days after the Windows release), and the brand-spanking new *Enemy Territory: Quake Wars* from Splash Damage.

Epic hasn't been supporting Linux quite as long as iD, but it still pushed the limits of OpenGL on Linux when it released binaries for *Unreal Tournament*. It's since released binaries for *Unreal Tournament 2003* and *2004* as well – the Linux installer for *2004* was even on the Windows CDs – and *Unreal Tournament 3* binaries are on the way as well.

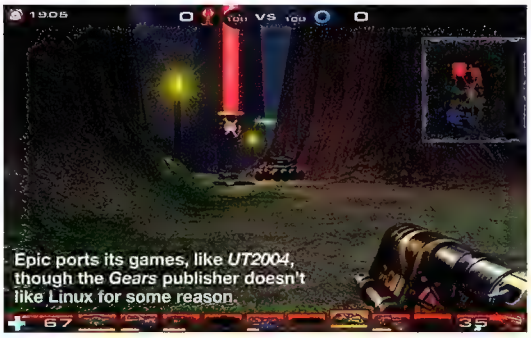
Other developers have flirted with Linux binaries as well, such as BioWare, with its port of *Neverwinter Nights*, but these efforts are rare, since few publishers can justify the costs involved. The only notable exception is S2 Games, developers of the *Savage* game series. *Savage 2* is set to have a Linux port available at release, and the first *Savage* game, which also had a Linux port, is now available as a free download.

Enemy Territory: Quake Wars Settings: 1440x900, 16X AF, 4X AA	
Windows	**59.6**
Linux	**62.7**

There have also been a few attempts at creating boxed Linux titles, following a business model that's proven successful for Mac porting houses like Aspyr Media. Loki Software ported a number of titles in this manner

***Enemy Territory: Quake Wars* is the latest major Linux title.**





Epic ports its games, like *UT2004*, though the *Gears* publisher doesn't like Linux for some reason.

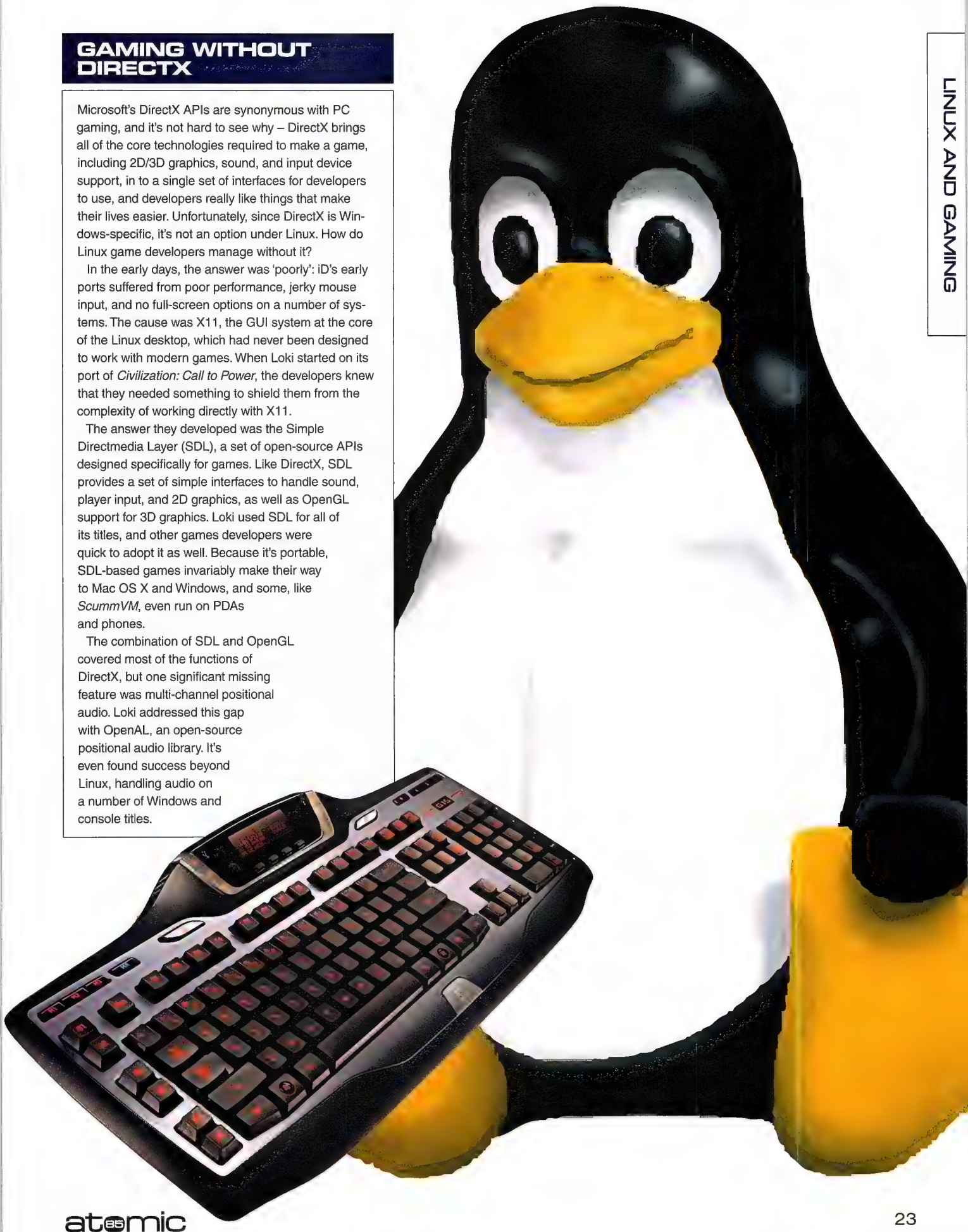
GAMING WITHOUT DIRECTX

Microsoft's DirectX APIs are synonymous with PC gaming, and it's not hard to see why – DirectX brings all of the core technologies required to make a game, including 2D/3D graphics, sound, and input device support, in to a single set of interfaces for developers to use, and developers really like things that make their lives easier. Unfortunately, since DirectX is Windows-specific, it's not an option under Linux. How do Linux game developers manage without it?

In the early days, the answer was 'poorly': iD's early ports suffered from poor performance, jerky mouse input, and no full-screen options on a number of systems. The cause was X11, the GUI system at the core of the Linux desktop, which had never been designed to work with modern games. When Loki started on its port of *Civilization: Call to Power*, the developers knew that they needed something to shield them from the complexity of working directly with X11.

The answer they developed was the Simple Directmedia Layer (SDL), a set of open-source APIs designed specifically for games. Like DirectX, SDL provides a set of simple interfaces to handle sound, player input, and 2D graphics, as well as OpenGL support for 3D graphics. Loki used SDL for all of its titles, and other games developers were quick to adopt it as well. Because it's portable, SDL-based games invariably make their way to Mac OS X and Windows, and some, like *ScummVM*, even run on PDAs and phones.

The combination of SDL and OpenGL covered most of the functions of DirectX, but one significant missing feature was multi-channel positional audio. Loki addressed this gap with OpenAL, an open-source positional audio library. It's even found success beyond Linux, handling audio on a number of Windows and console titles.




FreeSpace 2 is in space, and it's... free!

"Since the release of the Quake III code, some of the more popular mods have become stand-alone games."

from 1998 to 2001, including *Civilization: Call to Power*, *Sid Meier's Alpha Centauri*, and *Tribes 2*, but sales fell below expectations; partly due to the Linux versions debuting well after the original Windows versions. Loki declared bankruptcy in early 2002, but its legacy lives on today in the tools and libraries it developed to make Linux a viable gaming platform.

A similar company, Linux Game Publishing (**www.linuxgamepublishing.com**), was founded in 2001 and continues today. LGP sticks to more niche titles (*X²: The Threat* is perhaps its most mainstream release to date) and a less ambitious release schedule, which has allowed them to succeed where Loki failed.

Some older games eventually find their way to Linux through open-source versions of the game engines. iD has famously open-sourced its old engines, up to and including the *Quake 3* engine, and some other developers have done likewise. The best example is space combat sim *FreeSpace 2*, originally released for Windows in 1999, which was open-sourced by developers Volition in 2002. The community quickly added a number of new features, including a Linux port, based on an OpenGL version of the game's graphics engine.

Though the initial release contained just the source code and required the original Windows CDs to run, the entire game is now available free of charge; at **www.fsoinstaller.com** you'll find an installer that will download the game data, as well as the latest version of the open-source engine.

Even in the absense of source code, some developers have managed to produce Linux ports of commercial games by reverse-engineering and re-writing the original game engine. The best example of this is *ScummVM* (**www.scummvm.org**), a clone of the *SCUMM* engine used in classic LucasArts adventure games like *Maniac Mansion* and *Day of the Tentacle*. LucasArts has refused to assist the project, despite the fact that it's far and away the best way to play its old games, even on Windows, but other developers have been more supportive. Revolution Software, for instance, supplied code for many of its old adventure games, and has also released the game files for many of them, including the classic *Beneath a Steel Sky*, as freeware.

Open-source games

Open-source can't help to match the budgets and break-neck development pace of commercial games, but some of them are still great fun, and they won't cost you a cent to check out.

Shooters

The FPS genre is well represented in the open-source world, in no small part thanks to iD's engine source code releases. There's now a wide selection of games based on these engines, and one of the best is *Nexuiz* (**http://alientrap.org/nexuiz/**), a multiplayer shooter that shuns realism in favour of classic sci-fi deathmatch gameplay.

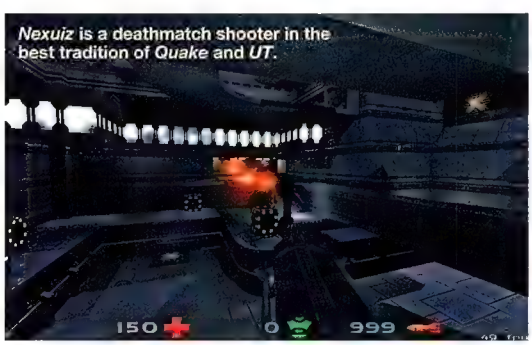
It uses a heavily modified version of the *Quake I* engine called DarkPlaces, but you can barely recognise it here: *Nexuiz* has an impressive array of graphical effects that can bring mid-range video cards to their knees. There's a good range of gameplay options on offer too, including modes like instagib and vampire, and it even has some decent bots to play against if you don't want to play online.

Alien Arena (**red.planetarena.org**) is another sci-fi deathmatch shooter, though its presentation draws on '50s B-grade sci-fi for inspiration, with cheesy weapons and bug-eyed aliens in space suits. It runs on a modified *Quake II* engine called CRX that adds modern eye candy like light blooms and real-time lighting and shadows.

Since the release of the *Quake III* code, some of the more popular mods have become stand-alone games. *Urban Terror* (**www.urbanterror.com**) is perhaps the best known example: it's a semi-realistic tactical shooter that's been around almost as long as *Counter-Strike*, and offers similar gameplay.

Another is *Tremulous* (**tremulous.net**), a team-based shooter with a sci-fi setting and a combination of FPS and RTS elements. The two teams on offer – human and alien – are comprised of very different classes, but they're well balanced, which gives the gameplay a lot of depth.

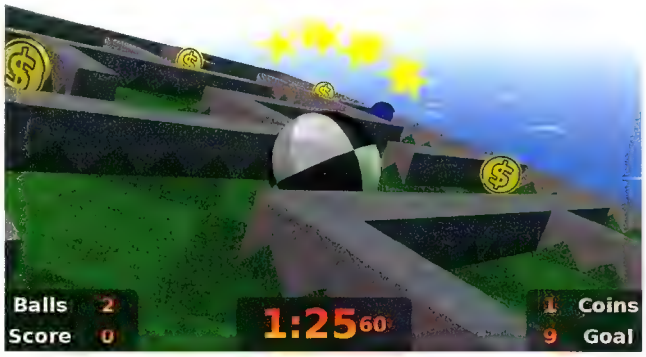
There are at least a few non-*Quake* shooter engines out there, and *Sauerbraten* (www.sauerbraten.org) is definitely the neatest. Instead of having an external map editor, *Sauerbraten* lets you edit both item placement and the actual level geometry and texturing from inside the game. It's primarily a multiplayer game, but it has some support for bots as well.



Nexuiz is a deathmatch shooter in the best tradition of *Quake* and *UT*.


The artwork in *The Battle for Wesnoth* laughs at other open-source games.

Insure your PC against 'accidental' breakage before playing *Neverball*.



Strategy

Strategy games aren't as well represented as FPS games, but there are still some great options. For old school *Civilization* action, there's *Freeciv* (**freeciv.wikia.com**), an improved clone of *Civilization II*. It uses GTK for the user interface rather than custom controls, but the UI fits the game nicely. The AI plays a pretty good game in the latest versions, but online multiplayer with friends is still the best option.

Perhaps a better option for single players is *The Battle for Wesnoth*, (**www.wesnoth.org**), a turn-based strategy game with a fantasy theme and a focus on combat. It has a number of campaigns to play through alone, as well as online multiplayer support.

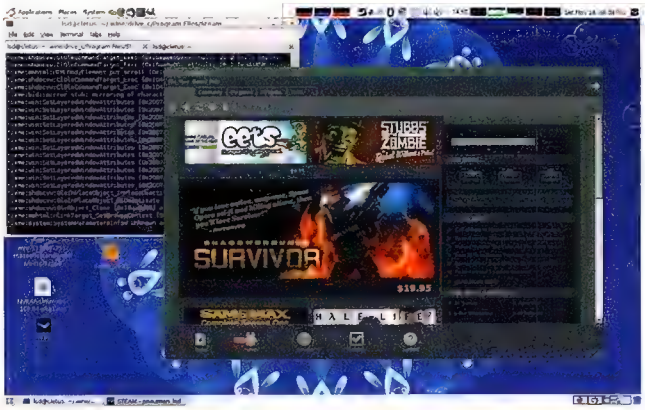
The best RTS option is *Bos Wars* (**www.boswars.org**), a sci-fi RTS along the lines of *StarCraft*. It started life as *FreeCraft*, a cloned *WarCraft II* engine compatible with the original *WarCraft II* game data, which became a generic RTS engine called Stratagus after legal nudging from Blizzard. It's not quite as mature as the turn-based alternatives but it's still good fun, especially in multiplayer.

Pick-up-and-play

If you've got ten minutes to burn, these are the games to reach for, and because they stick with simple concepts that are well-executed, they're some of the most fun open-source games available.

Neverball (**http://icculus.org/neverball**) is a great example: based on *Super Monkey Ball*, it's a frustratingly addictive blend of puzzle gaming and twitch-action that has you guiding a ball through precarious maze-like levels. There's a smooth difficulty curve that takes you from the simple through to the hair-pullingly-insane. It features solid mouse controls but a gamepad with an analogue stick is definitely the best way to play. It also includes *Neverputt*, a similarly crazy mini-golf game.

If I can mention only one classic puzzle game, it has to be *Crack-Attack*



Steaming it up under Linux.

A+ CASE
Brought to you by Tagan

EL DIABLO
The Devil's in The Details



CS-EL Diablo BM

Leading case makers know that paying attention to small things makes a big difference. Enter the EL Diablo from A+ Case. It is designed for those who already know what they want in their chassis.

- 2PCS enormous 250 mm fans (front & side)
- VR fan speed control (front & side)
- Blue Led illumination
- 1.0mm SECC/100% ABS plastic parts
- Excellent cooling solution
- Tool-less clips & rails for easy installation
- USB 2.0 and IEEE 1394 firewire connectors
- Dimension 570 x 205 x 520mm (D*W*H)
- Drive Space
- 5.25" * 5 - External
- 3.5 * 1 - External
- 3.5" * 7 - Internal
- Material Chassis: 1.0 mm SECC; Frontpanel: ABS Plastic

actiontec
www.actiontec.com.au

Proudly distributed by Actiontec Pty Ltd
E-mail:sales@actiontec.com.au
Tel:61 2 9008 1153, Fax:61 2 9790 8157



(**http://aluminumangel.org/attack/**). It's based on *Tetris Attack* for the SNES, and like any good puzzle game it's simple to learn but hard to master. It also has a great head-to-head network multiplayer mode.

Everyone loves *Guitar Hero*, and *Frets on Fire* does a pretty good job of bringing the experience to Linux. It comes with a few songs, but you can grab more from fan sites, or import songs from the original *Guitar Hero* discs. The keyboard controls are surprisingly good, especially if you have a wireless keyboard that you can stand up with, but it also supports guitar controllers like the USB X-Plorer for the Xbox 360.

WHAT ABOUT CEDEGA?

You may have heard of Cedega, a proprietary version of Wine from Canadian developers Transgaming that's specifically designed to run games. Transgaming pioneered support for DirectX in Wine, supporting a large number of games that standard Wine at the time was completely incapable of playing.

However, Transgaming invoked the wrath of the Wine community by not only charging a $US5/month subscription fee for Cedega, but also keeping its own changes proprietary while benefitting from the other improvements in Wine that the community at large was developing. Transgaming was within their rights to do this, thanks to Wine's MIT open-source licencing, which is more liberal than the more common GPL licence, but many in the Wine community were still unhappy with Transgaming free-loading on their work.

In the end, the Wine developers decided to relicence Wine under the LGPL licence, effectively forbidding Transgaming from incorporating any future Wine improvements into Cedega. This, along with seeming financial instability inside Transgaming, put a dampener on Cedega development.

Transgaming has recently been buoyed somewhat by success with its Cider product. It's essentially a version of Cedega that's designed to be packaged with games, allowing them to run on Linux or Mac OS X with little or no modification, and it's been used for a number of releases, including the Mac and Linux versions of the *EVE Online* client and a number of EA Mac ports. Improvements made as part of Cider, such as the addition of DirectX 9 and PS2.0 support, has since arrived in Cedega, and more is promised in the near future.

The problem is that regular Wine is getting so good now, with its support for DirectX 9 and Shader Model 3.0, that in many ways it's caught up to, and even surpassed, Cedega. In fact, it might be the opposite: Cedega may not run brand-new games like *Call of Duty 4*, but Wine can, even if it requires patching and fiddling to do so.

Cedega is still a good option if you want maximum ease-of-use: the $5 a month won't send you broke, and its GUI and built-in games database makes it very easy to get supported games installed and running. If you don't mind manual tweaking though, and you want to get games running as soon after release as possible, then standard Wine is the best option.



COD4: the new mail delivery game that everyone's talking about.

Wine

There's another way to bring Windows games to Linux, and that's with Wine, which provides a Windows-like environment to applications by running them against its own versions of the Windows system libraries. Unlike Parallels or VMware, there's no need for a real Windows licence or installation, and no hardware emulation to interfere with performance.

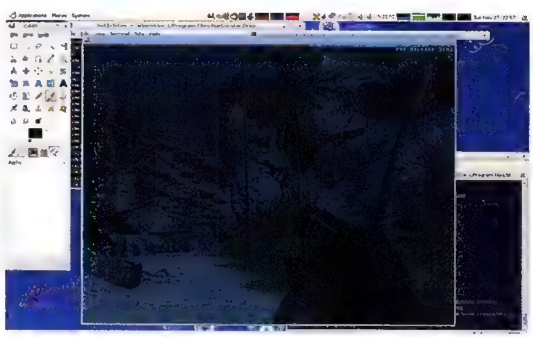
Wine initially focused on business applications, though it did support some games: Direct3D was a no-go but there was enough DirectDraw support to run 2D games like *StarCraft*, and some OpenGL-based 3D games, like the original *Half-Life*, worked well too. It wasn't until a couple of years ago that work started on a Direct3D layer, using OpenGL to access the hardware and translating HLSL shader programs in to their GLSL equivalents.

Reimplementing Windows and DirectX is a mammoth task, so compatibility is limited, but quite a few games do work. Valve's games are probably the best example: Wine has good support for both Steam and the Source engine, so you can buy, download, and play *Half-Life 2*, *Portal*, or *Team Fortress 2* under Linux with minimal hassle.

Some games require extra DLLs or registry tweaks to get running, but the Wine application database (**http://appdb.winehq.org/**) has all of the details on what games work, and how to get them running. You'll find setup instructions there for hundreds of games, including major titles like *World of Warcraft*, *Civilization IV*, *Supreme Commander*, *EVE Online*, *The Elder Scrolls IV: Oblivion*, *World in Conflict*, and *Call of Duty 4*.

You can even run *Crysis* under Wine, and while the graphics are glitchy and the framerate is poor, the fact that it works at all is amazing. Shader support is definitely one of the fastest-moving parts of Wine today, and DirectX 9 shaders have only been enabled by default in the last few releases, so I wouldn't be at all surprised to see shader-heavy games like *Crysis* and *BioShock* running well enough to play within the next few months.

Every distribution should have Wine packages, but development moves so quickly that these will almost always be out of date. The Wine developers themselves maintain up-to-date packages for most of the popular distributions though, so the easiest way to get an up-to-date version is to go to the Wine download page (**http://www.winehq.org/site/download**) and check the instructions for your distribution.



It's glitchy, it's slow, but by gum, it's *Crysis*!

VIDEO HARDWARE

Hardware support has long been a problem under Linux, and while we still have some problems with boring things like scanners and printers, video hardware is pretty well supported these days. We've certainly come a long way from the days when I had a Matrox G400 for *Quake III* (John Carmack himself worked on the open-source drivers for it), and two Voodoo 2s for *Unreal Tournament*.

We came a lot of that way when NVIDIA finally released its official drivers. Many gamers were disappointed that the driver was closed-source, but no-one was disappointed with the performance; OpenGL under Linux was easily on par with Windows. NVIDIA has kept that level of performance through all of its hardware and driver releases, making NVIDIA cards the best choice for Linux gamers.

ATI initially stuck with open-source drivers, hiring X specialists to write the code, but these drivers had minimal features and poor performance. ATI eventually developed its own binary-only driver called 'fglrx', which continues today as the official Catalyst drivers for Linux. It's a solid driver, with great compatibility, but it's still not as quick as NVIDIA's. Hardware support takes longer to come as well: there are still no Radeon HD 3000 series drivers, for instance, though NVIDIA made beta 8800GT drivers available within weeks of that card's release.

The only other player in the video space is Intel, with its on-board solutions. If you're stuck with that on your laptop, you'll be happy to know that Intel produces open-source drivers for all of its video chipsets, so they should work out-of-the-box with any modern distribution. As with Windows, you shouldn't expect to play modern games, but older games and a lot of open-source games run just fine with appropriate settings.

Performance

Wine benchmarks		
	Half-Life 2	Portal
Windows	**133.75**	**156.08**
Wine Direct3D 8	**80.77**	**141.01**
Wine Direct3D 9	**29.52**	**16.07**

Because Wine is a compatibility layer, rather than an emulator running Windows in a virtual PC, it generally performs very well. The performance depends on how good the Wine versions of libraries are compared to the original Windows versions, but most of the core ones are pretty good, so many applications run just as fast under Wine as they do on Windows.

The DirectX layer is the major exception, because of the complexity of implementing Direct3D on top of OpenGL. Translating Direct3D API calls to their OpenGL equivalents adds some overhead, but the biggest performance drain seems to come from translating the data – the geometry, textures, and shaders that make up the game world – between Direct3D and OpenGL formats. When these are loaded ahead of time, the performance can be very good, but it suffers when games need to stream or modify textures or geometry on-the-fly. DirectX 9 shaders also seem to impact frame rates significantly.

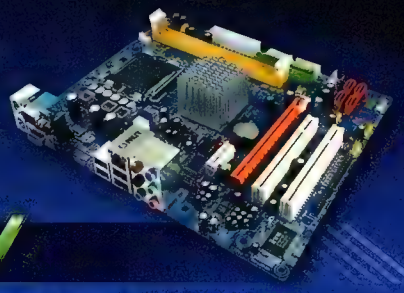
Despite the issues, none of the games that Wine supports are really rendered unplayable due to low frame rates. *Team Fortress 2* is super-smooth when forced to run in DirectX 8 mode, and *Call of Duty 4* is certainly quick enough with enough of the eye-candy turned off. It's still early days for Direct3D under Wine though, and the focus is still on compatibility rather than performance. As the compatibility improves and more games start to run on Wine, the developers will be able to put more time in to solving these kinds of performance issues.



PALIT®

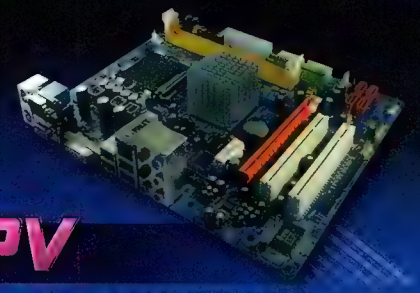
NVIDIA

GeForce 7 Series Motherboard
Better Vista Premium, Application, Gaming Support
Best cost/performance motherboard for Intel platform entry PC



N73V

LGA775 based Core 2 Duo / 1066MHz FSB
2GB DDR2 667 memory module

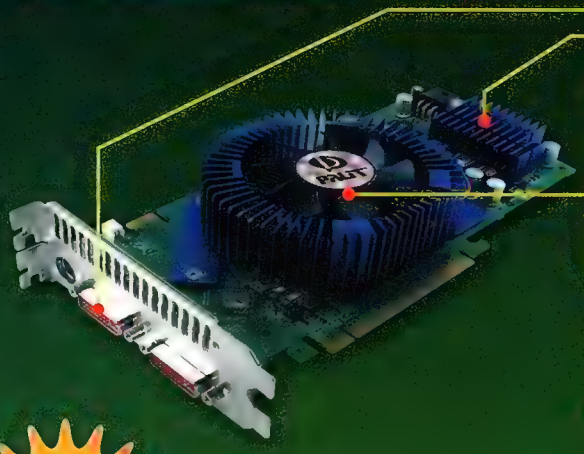


N73PV

LGA775 based Core 2 Quad / 1333MHz FSB
2GB DDR2 800 memory module

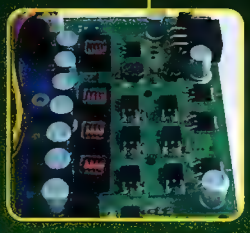
Palit 8800GT Sonic

512MB / 256bit / DDR3





- Palit's Own Design
- Effective Cooling System
- Lower Noise



- 3-Phase Power Supply System



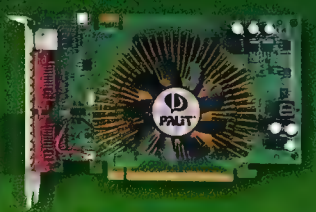
- HDMI Technology Support



Super 1024MB

Palit 8600GT Super+1GB

1024MB / 128bit



Palit 8500GT Super+1GB

1024MB / 128bit



Distributor:

BroNet Wireless & Broadband

www.palit.biz

HARDCORE

SPONSORED BY XFX play hard.

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

It's another bumper crop of hardware reviewed, tested and plain put through its paces until it falls over gasping for breath. The Atomic Labs is like Survivor – but instead of tormenting stupid Americans, we torment tech.

On the rack this issue is a mess of motherboards and a raft of graphics cards. Foxconn, Abit and ASUS mobos all come under intense scrutiny, while pixel pushers from AMD ATI and Nvidia face up to our testing torment. We also have the latest CPU from AMD to play with.

We peer closely at some tasty DDR3 RAM and we finally put Big Willy to use and scare the living bejesus out of a couple of PSUs.

And what would all of this great gear be like if you couldn't house it all in safety and style? With that question in mind, we've taken a Head to Head look at eight luxury PC cases to find the best home for your PC investments.









HARDCORE CONTENTS

Gearbox 32
It must be router month...

Head to Head: 34
PC Cases
We put eight of the best to the test to find the best looking, most sturdy case for PC enthusiasts.

Reviews

Phenom X4 9900	47
Foxconn P35 Mars	48
Abit IP35	50
ASUS 790FX	51
Patriot DDR3-1866 C8	51
AMD ATI HD3870	52
AMD ATI HD3850	52
XFX 8800GTS 512	55
ECS 8800GT custom	55
Silverstone Decathlon	56
Hiper Type R770W	56

Kitlog 58
The cream of the Atomic hardware crop.

Chippery 60
Enthusiast views for enthusiast dudes.

Ground Zero 62
Dan Rutter wants to heal the world.

Win a powerful YSP900SW Sound Projector set up from Yamaha and Atomic!

The YSP900SW is a great choice for audiophiles who want surround sound, but don't have the room for lots of speakers and cables. In this one slimline unit you get the power of a full orchestra... or a crushing artillery barrage, if that's more your thing. The YSP900SW is worth $1,499, and one lucky winner can score one in the usual way.



www.atomicmpc.com.au/competitions



NRG™

Hardcore Gaming Systems

NRG's extreme machine has joined forces with nVidia's 8800GTS and 780i chipset to bring you an unparralled, unrivalled and over-clocked super machine!

Buy this 'Hardcore' piece of equipment **TODAY!**



Mist eXtreme

CPU	Intel Core 2 Extreme QX9650 Quad Core CPU, 3.0 GHz, FSB 1333MHz
Memory	Corsair 2GB High Speed DDR2 RAM
Chipset	Nforce 780i SLI Chipset
Video	2x nVIDIA 8800GTS 512MB. In SLI Mode
Storage	1 TERABYTE OF SPACE (2 x 500GB SATAII HDD in RAID 0)
OS	Microsoft Vista Ultimate
Cooling	Advanced Cooling System
SLI	SLI Video

NVIDIA GeForce · NVIDIA SLI™ · NVIDIA nForce

NVIDIA Authorized Distributor

ALTECH COMPUTERS

WWW.ALTECH.COM.AU/NRG

SYDNEY
Unit R, 10-16 South St
Rydalmere
NSW 2116
Tel +61 2 8831 9999
Fax +61 2 8831 9988
sales-syd@altech.com.au

MELBOURNE
Building 3
13-15 Brough St
Springvale VIC 3171
Tel +61 3 9558 5090
Fax +61 3 9558 5091
sales-mel@altech.com.au

BRISBANE
62-64 Hope St
South Brisbane
QLD 4101
Tel +61 7 3017 2000
Fax +61 7 3017 2020
sales-bris@altech.com.au

PERTH
Unit 2, 8 Carbon Crt
Osborne Park
WA 6017
Tel +61 8 9242 8822
Fax +61 8 9242 7383
sales-wa@altech.com.au

BENCHMARK

How we test, what we test, when we test it

3DMark05 and 06 are the legs of our bench. As freely downloadable tools, they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and its ability to keep our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All tests are run at 1280 x 1024, 1600 x 1200 and 1920 x 1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multithreaded version of the popular MP3 encoder, which is used to compress a standard 30-minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!



The *Atomic* Hot Award is given only to the best. In our roundups, we differentiate the best further using the following awards:

VALUE AWARD This means the product is the best buy price-wise.

PERFORMANCE AWARD Price isn't a big factor – it just has to make our benchmarks burn and our eyes water.

EXTREME AWARD Forget everything. If it's *mind-blowingly amazing*, then it'll get an Extreme Award.

BENCHMARKS

Graphics

3DMark05
Game tests only, 4xAA, 8xAF
www.futuremark.com

3DMark06
Game tests only, 4xAA, 8xAF (SM2.0), 8xAF (HDR/SM3.0)
www.futuremark.com

Half-Life 2
Canals custom timedemo, 4xAA, 8xAF, all details highest, HDR off
www.half-life2.com

Splinter Cell: Chaos Theory
Lighthouse Demo, Shader Model 3.0, 8xAF, shadow resolution high, all features on
www.splintercell3.com

X3 Rolling Demo
High settings, auto quality control disabled, glow enabled, 4xAA, 8xAF
www.egosoft.com/games/x3/info_en.php

Call of Duty 2
Hill 40 – Defend custom timedemo, 4xAA, 8xAF, all options highest
www.callofduty2.com

Quake 4
High quality, 4xAA, 8xAF, Multiple CPU support, all options highest
www.quake4game.com

Subsystems

HDTach
www.simplisoftware.com

LAME MT
softlab.technion.ac.il/project/LAME/html/lame.html

VirtualDubMod
virtualdubmod.sf.net

SuperPi Mod
www.xtremesystems.com/pi

Cinebench
www.cinebench.com

SiSoft Sandra
www.sisoftware.co.uk

Everest
www.lavalys.com

Others

DisplayMate
www.displaymate.com

ATI Tool **www.techpowerup.com/atitool**

RivaTuner
www.guru3d.com/rivatuner

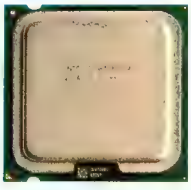
FRAPS
www.fraps.com

CPU-Z **www.cpuid.com**

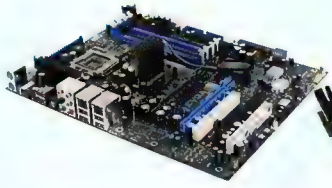
Stress Prime 2004 Orthos
sp2004.fre3.com

ATOMICBENCH Our standard hardware that gets regular labs lovin'.

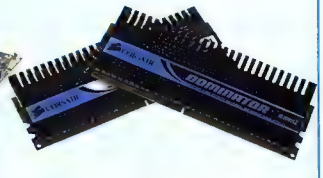
INTEL TESTBENCH



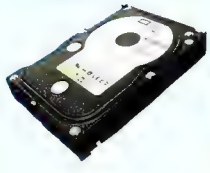
▲ Intel Core 2 Duo X6800



▲ EVGA 680i SLI



▲ 2GB Corsair Dominator PC2-10000



▲ WD 1500ADFD

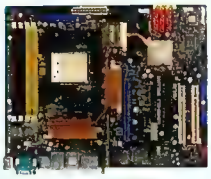


▲ Enermax Galaxy 1000W

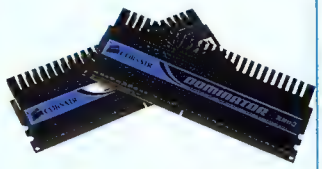
AMD TESTBENCH



▲ AMD Athlon 64 FX-62



▲ ASUS M2N32-SLI Deluxe



▲ 2GB Corsair Dominator PC2-10000



▲ Dell 2405FPW



▲ ASUS 8800 GTX

More top tech toys to titillate your techno-lust.



SMC Barricade N Wireless Gigabit Router

Price $269 Website www.smc.com

Also known as the SMCWGBR14-N, SMC's latest offering is a networking powerhouse. The Barricade N is an almost all-in-one solution – you'll still need a separate modem, but in the Barricade's old-school chassis you'll find a 4-port 10/100/1000 switch, a USB2.0 ready multi-function printer server, and built-in wireless access point rated up to draft n speeds.

There's a host of other features to make packet-pushing that much easier and secure – a built in NAT firewall protects your precious network from snoops, while Stateful Packet Inspection keeps an eye out for DoS attacks. Intelligent stream handling technology keeps timely data moving as a priority, smoothing out streamed media and reducing lag and stutter in online games. Finally, the wireless setup is made easy with push button technology and PIN protection.

USB Disk Dock

Price $75 Website www.pccasegear.com

Here's something straight from the "why didn't we think of that ourselves?" category. If you're like us, you probably have a mess of spare SATA hard drives floating around, probably with all kinds of useful – or at least, personally cherished – data on them. In the bad old days, you'd have to find some fiddly enclosure for them, or – gasp! – open your case to install the things to get at those precious ones and zeroes.

Not any more! This USB, mains-powered dock works not unlike an iPod, and lets you access any 2.5in or 3.5in SATA drive just by plugging it in and turning the dock on. Having one at, say, work and one at home is a great way to carry large amounts of data around, and as the dock doesn't need any drivers, you can use it on any machine you could want – great for setting up LAN parties.





X-mini Capsule Speaker

Price $44.95 Website www.electronicsnow.com.au

Since the dawn of time, humanity has yearned for a way to take their tunes into the wide world and share them with friends. In the dark ages, primitive Boombox Man used, well, a boombox; then came Homo Skaterus with the smaller, more personal Walkman. But still, the issue remained – how do you make small speakers that sound big?

X-mini finally has the answer, and a new age has dawned.

The X-mini Capsule Speaker is an unassuming device that can fit in your pocket alongside your MP3 player of choice. Plug it in, turn it on, and expand the resonance chamber, and suddenly you'll have a big sound coming from, seemingly, nowhere... primitive Boombox Man would call it magic, but we call it groovy. The Capsule Speaker delivers rich bass, a rich high end, and can pump out the jams for up to eight hours at full charge.

TP-Link 108M Wireless ADSL2+ Modem Router

Price $99 Website www.anywhere.com.au

Performance is all well and good, but sometimes you really want something that's also going to be light on the old hip pocket. In this little wonder from TP-Link, you get both.

The 108M is not rated up to draft n speeds, but it's still a fully specced ADSL2+ modem router; it utilises 108M Super 11 and eXtended Range WLAN technologies to bring you transmission speeds of 108MBps under ideal circumstances, and at two to three times the range of similar routers.

You're not getting a lot of extra bells and whistles, but frankly with the money you save you could pick up, for instance, some extra RAM, a new game, or take someone special out on a date. In fact, we'd recommend the dating option, 'cause if like us you're excited by the idea of a cheap modem router, your girlfriend probably puts up with a lot already.



Pocketsurfer2

Price $399 Website www.pocketsurfer.com.au



Staying in touch with the ever-shifting quagmire that is the internet while on the road can be a tough balancing act. You can get a cut down web experience over a phone, but, well, it's cut down. Ever tried reading the Atomic forums on a phone? It sucks. Alternately you can carry around a laptop, engage in a bit of friendly wardriving/walking, and get the web as it was intended – but you're still burdened with a burnt lap and a device that's not exactly public transport friendly.

Enter the PocketSurfer2!

DataWind's latest wireless handheld web device uses patented acceleration technology to package up the full web experience server-side, then pushes compressed but complete sites out to your device – and in no more than seven seconds. You can access Google Maps, which when combined with a mini-GPS device, lets you pinpoint the nearest restaurants, banks, cinemas and more. The best thing is for the first year there are no data fees; it's all part of the purchase price. Never miss out on a flame war again.



Console Access Pro Tool Kit

Price $US19.99 Website www.thinkgeek.com

We don't really know why you'd want to open up your console, a console that you paid for and is yours and no one else's, and mess about with the insides. We don't know why you'd want to void your warranty like that. No idea. None, zip, nada, zilch. But if for some crazy reason you did want to do just that, then we guess you better have the right tools for the job.

This neat little toolset offers you everything you could possibly need to open up the following consoles: Original Xbox, Xbox 360, and controllers; Nintendo Wii, GameCube, GBA, DS, DS Lite, and some accessories; Sony PS3, PS2, PSone, and PSP and most accessories. Ever wanted a Tamper Resistant Torx bit? This set has one. How about a Triwing bit? No problem. Also included are a pair of magnetic tweezers.

But we still have no idea why you'd want to open up a console. Go figure.



Belkin N1 Vision Wireless Router

Price $260 Website www.belkin.com.au

February is obviously router month, as here we have a third and, quite frankly, very pretty connectivity option. Belkin's had a growing reputation for making very good, very attractive products for years, but the design guys have gone overboard on this one. The entire router looks more like a fancy clock radio, thanks not only to the sleek, not-out-of-place-in-any-room design, but also to the large LCD display.

Using the display you can tap through a number of screens. Network speed can be monitored, as well as bandwidth usage (handy for finding out who is causing you all that damn lag), network device status and who's downloading every episode of *Heroes* and frying your download limit. Handy stuff. You've also got the usual array of four Gigabit LAN ports, Wi-Fi Protected Setup, VPN support and all the encryption options you could want.

ATI MSI Radeon HD3850 256M PCI-E From; *$287



Intel CPU E6850 Core 2 Duo 1333 FSB 3.0 GHz From; *$364



BenQ FP222W 22" WIDESCREEN LCD 5ms From; *$319



Logitech G9 Laser Gaming Mouse From; *$109



Logitech G15 REV 2 Gaming Keyboard From; *$105



Corsair TwinX 6400C4 2GB Kit 800 MHz 4-4-4-12 Timings From; *$129 RED HOT!



Western Digital Raptor 74G Raptor, 10,000 RPM SATA2 From *$204



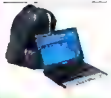
Asus P5N32-SLI s(775) Motherboard From *$326



www.arc.com.au

Asus G2S Notebook

Product Specifications:
Intel Core 2 Duo T7500 2.2GHz , 4MB
2GB Memory Supports 4GB DDR2 667
300GB SATA HD
DVD Burner
17.1" WXGA+ TFT 1440 x 900
Webcamera
nVidia GeForce Go8600M GT 256MB
TV Tuner/ Card Reader / Bluetooth / Modem
10/100/1000 Lan / Intel Kedron 802.11a/b/g/n
Genuine Windows® Vista™ Ultimate



From; $3135

ARC COMPUTERS
Ph (02) 9748 8322
Fax (02) 9748 8155
137-139 Silverwater Rd,
Silverwater NSW 2128

Local Outlets in NSW.
Silverwater (02) 9748 8322
Parramatta (02) 9633 5566
Chatswood (02) 9884 8655
Liverpool (02) 9821 4690
Penrith (02) 4721 1046

Trading Hours
Mon-Fri: 9:30am - 5:30pm
Saturday: 9:00am - 3:00pm

All price's listed are GST inclusive. Price's are subject to change without notice, Check website for current pricing. Price from 07/12/2007


SILVERSTONE
GIGABYTE

Best case scenario

It's all aluminium, rivets and case screws in this month's Head to Head, as Josh Collins and David Hollingworth put eight top PC cases to the test.

Sleek curves. Striking angles. Brushed steel highlights. Subtle mesh accents.

We could be talking about the chassis on a European sportscar, and in a way, we're certainly on the same track. The sleek, highly glossed shell of a Lamborghini may make you happy in your car pants, but it also serves a very practical purpose – it's sleek so that it can slice aerodynamically through the air while being pressed into the ground at high speed. Exotic materials like carbon mesh may look good, but they also strengthen the chassis while lessening the overall weight. A sportscar, like a Ferrari or a Bugatti, is a superlative example of form matching function in service of the highest ideals of performance.

So too for your PC case.

It may seem a long bow to pull, but you really do want the same things from a good case as you do from a good car. Reliability, enough room for everything you want in there, excellent airflow, good looks and many more similarities besides.

And, you know what? They're a lot cheaper, and you don't feel nearly as guilty about taking an angle grinder to a Lian Li in pursuit of the perfect mod – not something your average Porsche owner is ever likely to do!

With all of this in mind we've gathered what we think is a good sampling of the better cases on the market, given them a good hard stare down, and gathered them all together in one place for an in depth comparison and review. The cases we've got for you are:

COOLERMASTER
Cosmos 1000

LIAN LI
PC-V2000+
PC-A71B

SILVERSTONE
TJ07
TJ10B

THERMALTAKE
SwordM

GIGABYTE
3D Mercury
3D Mars

Of course, there's no hard and fast testing methodology for cases – unless someone can find us a copy of CaseMark06. We'd have loved to do some serious drop testing, too, but that might have caused a fuss (and Atomic HQ is only one story high – hardly a scientific drop height). Testing in this instance needs a bit more of a personal touch...

How we tested

Testing anything that more or less just sits there passively doing its job is a tough call. It's not like testing a graphics card or a CPU, where you can run a benchmark, get a score, and then rank all the contenders. Like reviewing a game, much of what one likes about a given case can come down purely to personal preference – do you prefer curves or angles, extra IO ports on the top or the front of the fascia, and so on. For the purposes of this round-up we sat down with each case and talked about what we liked, what we hated, how we could mod or use the case, and other hard to quantify things.

Thankfully, there's also a whole lot you can pretty easily nail down, like fan count and placement, number of drive bays, and so on. To help us look at each case in a fair and similar manner, here's the checklist that we run through, and the things we look for in a good case of any design:

Fascia design

This can be a bit of a vague one – personal preference is as important as actual build quality and control/IO placement. In general, however, we look for a nice, clean fascia, where any pure-design elements do not detract from actual useability. Machined power buttons rather than plastic is a plus; solid construction, easy to pop out bay covers and well built case doors all help a case to rate well in this area.

Cooling solutions

This seems simple on paper – how many fans a case has is a good indicator of how well it'll push cool air over your hot-hot-hot components. But we also look at fan placement, and how that placement affects air-intake. Are there obstructions that will impede airflow? Will a lot of dust get into the case? Is there room for after market cooling options like liquid set-ups or more fans? Any case that has pipe grommets already installed scores particularly well.

Drive space availability

Again, simple on paper, but it's not just about the sheer number of drives a case can take. What we also look for are ease of access to the drives, cable management features, and slide out drive trays.

> “Like reviewing a game, much of what one likes about a case can come down to personal preference.”

Interior space

Space… the final frontier… Sorry, couldn't help myself. The modern PC tends to have a lot going on inside it – cables everywhere, multiple HDDs and optical drives, heat-sinks the size of melons and all kinds of crazy pimped out lights and gewgaws. If you really want some serious computing, you need serious room, so this is an important factor in picking a case for many PC enthusiasts. It's also why we have photographed the cases on test so that the interior is clearly visible.

Internal design

It might seem like we're repeating ourselves, but when we look at internal design, we're pretty much looking at everything mentioned above, and more. A good case comes together like an elegant puzzle, utilising every bit of interior space and construction for a purpose. In particular, when it comes to design we look at overall cable management, how easy it is to dismantle sections of the case (ie, using screws wherever possible instead of rivets) and clever placing of component bays to keep things as neat and tidy as possible.

General aesthetics

Does the thing look any good? If you're like us,



	Lian Li PC-A71B	Lian Li PC-V2000+	Silverstone TJ07	Silverstone TJ10B	Coolermaster Cosmos 1000	GIGABYTE 3D Mars	GIGABYTE 3D Mercury	Thermaltake SwordM
Price	$379	$379	$348	$369	$268	$189	$482	$619
Height	595mm	617mm	560mm	521mm	628mm	522mm	620mm	650mm
Width	220mm	210mm	220mm	207mm	266mm	205mm	205mm	240mm
Depth	615mm	625mm	565mm	644mm	598mm	565mm	535mm	770mm
5.25in bays	5	7	7	4	5	5	4	6
3.5in bays	10	12	7	7	7	6	7	6
Cooling	6 x 120mm fans; water cooling grommets	3 x 120mm fans	4 x 120mm fans; 2 x 92mm fans	5 x 120mm fans max, 2 x included, water cooling grommets	4 x 120mm fans max, 3 x included	3 x 120mm fans; 2 x 80mm fans	5 x 120mm fans, water cooling	7 x 120mm fans, water cooling
Colours available	Black; Silver	Black; Silver	Black; Silver	Black; Silver	Silver	Black; Silver	Black; Silver	Black
Weight	1.55kg	1.7kg	2.1kg	1.85kg	2.3kg	1.1kg	1.9kg	3.4kg
Optional window	No	Yes	Yes	Yes	No	Yes	Yes	No
E-ATX compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

you're going to spend an awful lot of time sitting close to your PC, so you may as well have one that looks good. It's a hard thing to judge, as more than any other aspect of this round-up, a case looking good or bad depends on personal interpretation. But, in general, what we look for is overall elegance and completeness of design, while still adhering to the strictures of the case's function.

Weight

It's easy enough to measure, but it's also a very important consideration. Most enthusiasts spend a lot of time lugging their machines from desk to floor and back again, or even carting it about to LANs and other events. Being heavy isn't exactly a deal-breaker, but it's certainly something to keep in mind.

Construction

Your PC case will be home to thousands of dollars of hardware and equipment, and a lot of that stuff is pretty delicate. You've got moving parts, like fans, drives and water cooling systems, fragile processors and maybe even some lights. More than any other consideration, a PC case needs to be well built; tough enough to stand the test of time, to take a few knocks, and protect your gear. What we look for is any excessive flex in the case-frame, miscellaneous rattles and, in general, clever structural support. And don't forget whatever keeps the case off the ground; whether it sits on wheels or feet, you want something that's going to keep your machine stable and steady, without damaging whatever surface it rests on.

We also look for clever extras – nearly all cases these days come with a vast supply of case screws, but some give you a wide selection of case and thumb screws and a spare screw-driver or alum key. It's little things like this that separate a good case from an adequate one. Read on!



Lian Li V2000+



Supplier **www.anywhere.com.au**
Street Price **$379**

Lian Li has taken a step away from its classic square-edged design with the V2000+. Rather than stylishly bare expanses of brushed aluminium, this case features a prominent mesh fascia and top surface. As we were rating the case, more than one person pointed out it was very Mac-like – but don't hold that against this excellent design.

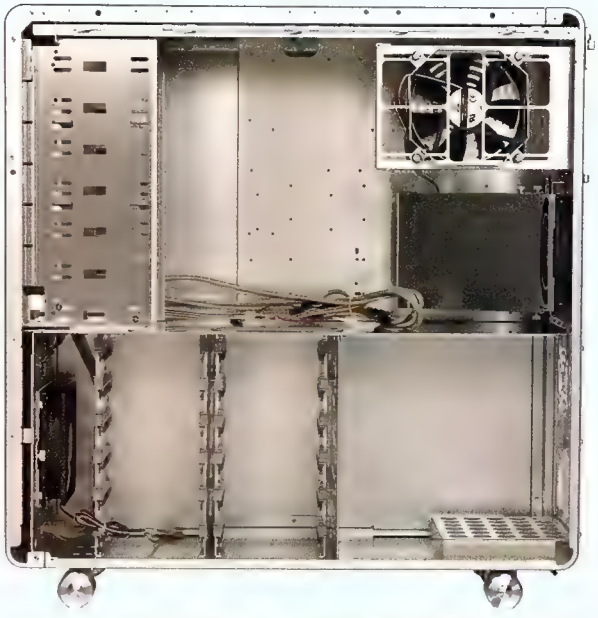
The mesh plates combine with the three 120mm stock fans to provide surprisingly good airflow, though you'll likely need to worry about greater dust penetration as well. There are two optional 80mm fan slots if you're really airflow conscious, located at the rear of the case below one of the 120mm jobbies.

You'll need that airflow if you're planning on taking advantage of the drive space on offer – there are 12 3.5in HDD bays, six 5.25in external bays, and the still oddly obligatory FDD bay. Drive-hungry video editing types will love this case.

The interior is very compartmentalised, which is either a blessing or a curse. On the one hand, it does help keep everything in its place, and each wall or compartment is well ventilated and completed with plastic-lined cable runs. But, if you're going to be digging around with a lot of upgrades or oversized components like frack-off huge power-supplies you might feel a little cramped. Your mileage may vary.

Lian Li has not stepped away from build quality, though. Lian Li techs have happily rolled every metal edge, smoothed the corners, and produced a case that is practically rattle free. It may not feel quite as solid as the top-placed Silverstone or the other Lian Li on test, but it's still a top effort from one of the most respected case-makers in the market today.

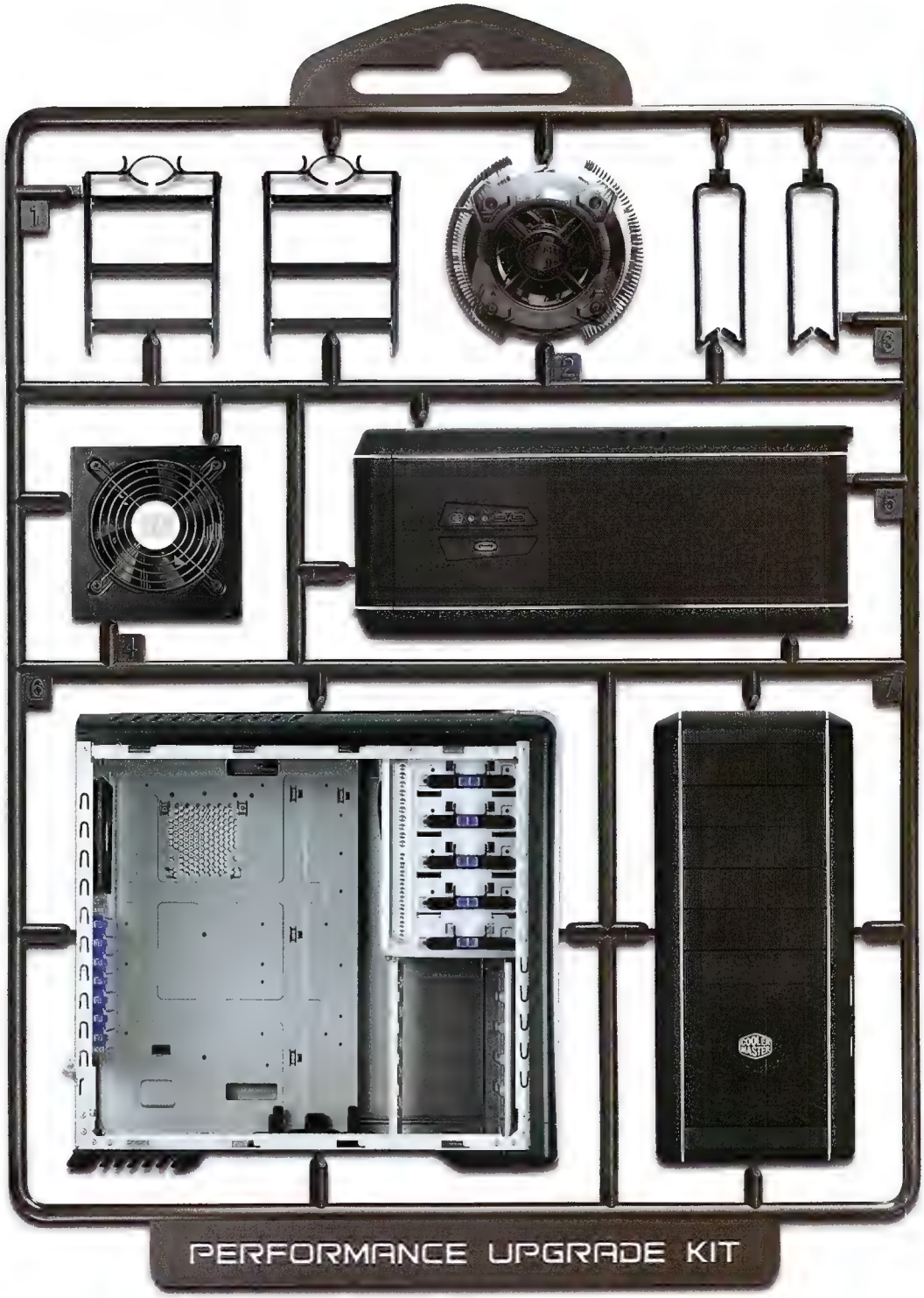
SCORE **8.5** OUT OF 10







COOLER MASTER®



CM 690



Set-up Guide:

1. Five removable HDD racks for easy maintenance and system upgrade
2. Shown above, but optional: CM Sphere CPU cooling
3. Unique cable management for tidy interior
4. Shown above, but optional: Real Power Pro PSU
5. Top cover mesh with two 120mm fans greatly enhances system cooling performance
6. **The only mid-tower chassis that is SLI Certified**
7. Stylish front panel mesh allows for consistent stream of airflow

www.coolermaster.com.au

Premium Resellers

VIC	Computers & Parts Land	03 8542 8688	www.cpl.net.au
	Centre Com	1300 007 600	www.centrecom.com.au
	MSY Technology Pty. Ltd.	03 9560 2288	www.msy.com.au
	Scorpion Technology	1300 726 770	www.scorptec.com.au
NSW	ARC Computer	02 9748 8322	www.arc.com.au
	Aus PC Market	02 9646 8088	www.auspcmarket.com.au
	Capitol Computer	02 9281 8890	www.capitolcomputer.com.au
	Umart International	02 9745 0877	www.umart.net
SA	Adrenalin Computers & Software	08 8410 0777	www.adrenalin.net.au
	DIY I.T. Supply	08 8340 8090	www.diyit.com.au
	IT4US Computers & Media	08 8231 7588	www.itforus.com.au
QLD	Computer Alliance	07 3421 3200	www.computeralliance.com.au
	Game Dude Computers	07 3387 1500	www.gamedude.com.au
	Dreamworks IT	07 3396 0544	www.dreamworks.com.au
	Umart Online	07 3369 3928	www.umart.com.au
WA	Austin Computers	08 9201 2788	www.austin.net.au/index.asp
	Trinix Computers	08 9350 1600	www.trinix.com.au
	YNOT Computer Systems	08 9330 7666	www.ycs.net.au
	Netplus Micro Computers	08 9242 7288	www.netplus.com.au

Thermaltake SwordM



Supplier **www.altech.com.au**
Street Price **$619**

We're sure there are people who really like the look of this case, but, unfortunately, none of those people work at Atomic HQ. The SwordM has been turning heads since its release early last year, and Thermaltake considers it the top of the line.

The design is striking, and creating a case that is effectively one big cooling vane is neat; but in reality this beast is just hard to like. It might be just our review case, but we struggled to open up the top, skinned our knuckles opening the side, and one nose was nearly broken when the side panel did open. And do you really need so many superfluous fins and luggage-rack-like attachments?

Once opened the case continues to un-inspire. Where every other case is packed with nicely kitted out bays, clever structural members and cable management features, the SwordM is like travelling back in time to beige box blandness. There are a total of nine 5.25in bays, three of which have been converted into 3.5in HDD bays, but little else of structural interest.

There's at least a lot of cooling love in the SwordM, including a liquid cooling system, a whopping seven 120mm fans and a couple of radiators. It's all rather annoyingly placed, though, with the water pump and reservoir sitting at the case's rear under a fold out door – which, when closed, obscures all the backside ports.

In fact, given that the case's side panels open like double doors, and the way the rear and top panel swing open, you need to leave a full two feet of clearance around the case if you ever want to actually access the internals.

It's great to get a case that has been designed for water-cooling from the ground up, but for nearly $200 less we recommend the GIGABYTE 3D Mercury solution over the SwordM.

SCORE **4.5** OUT OF 10







GIGABYTE 3D Mars

Supplier **www.rectron.com.au**
Street Price **$189**

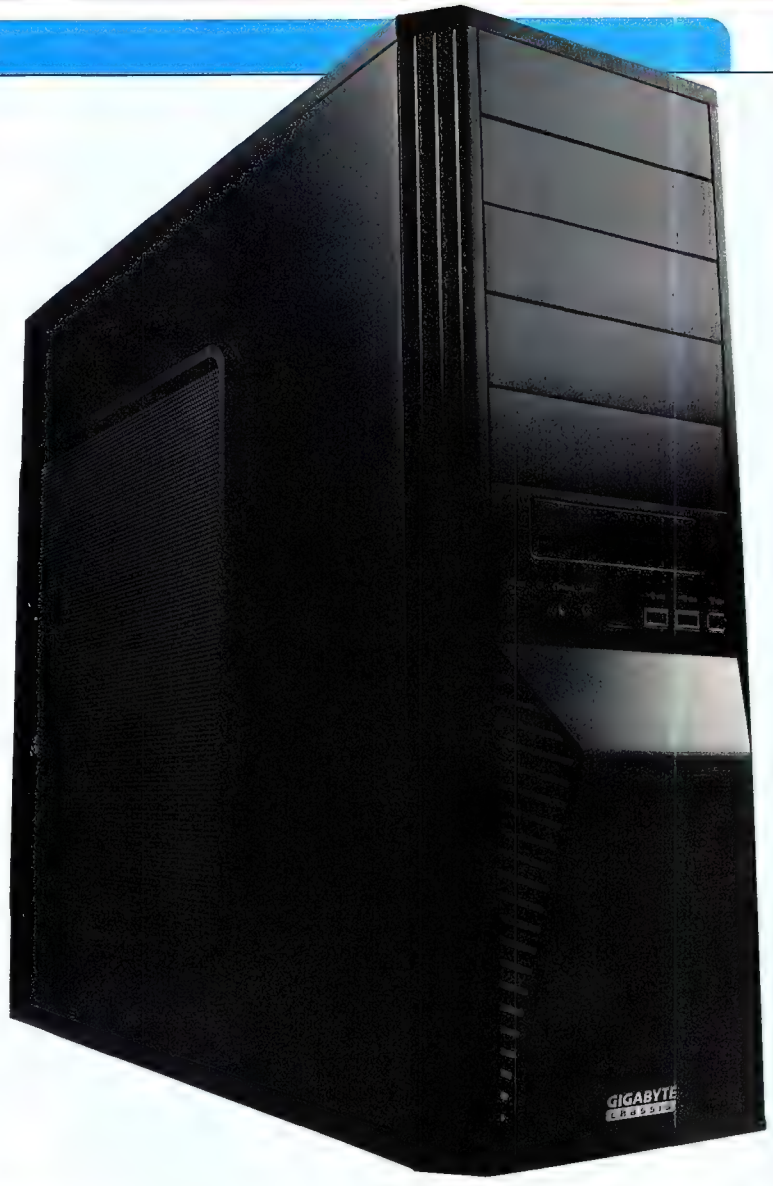
GIGABYTE is more well known for its excellent motherboards than it is for its excellent PC case design. Sad to say, there's a reason for that, and more than a couple of those reasons can be found in the 3D Mars.

First up – what's the deal with the odd grilled beak on the case's fascia? It looks like it's designed to add extra cooling, but all it adds is extra weight, while cunningly ruining the lines of what would otherwise be a classically elegant case-design. Thankfully even with the extra beak-weight, the 3D Mars is still easily the lightest case in the roundup, at 1.1kg. It's a good thing, too, as we simply do not have faith that the case's slide out plastic feet could handle much more. It's also the cheapest, and for the money, you are getting a good product.

Aside from the shaky feet, however, the case is solidly built and blessed with a very open interior. It's nothing to write home about, and anyone with a GIGABYTE case will likely recognise the identical parts used across much of the case range; it keeps the prices down, for sure, but it does lead to a certain same-ness that doesn't help GIGABYTE compete with the likes of Silverstone and Lian Li.

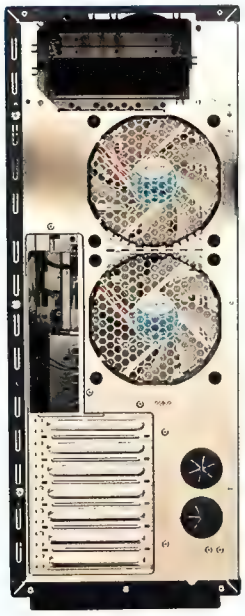
At least there's a good selection of stock cooling options. There are three 120mm fans (with blinged-up LEDs) brute forcing air straight through the case, and two smaller thin 80mm fans side mounted to blow air across the HD bay – which, by the way, can only take five 3.5in HDDs. At least there's room for five 5.25in drives in the external fascia.

Good cable management options top off the good stuff in the 3D Mars, but we still can't look past that damned beak. Why?!



SCORE **7.0** OUT OF 10







Coolermaster Cosmos 1000



Supplier **www.coolermaster.com**
Street price **$268**

We couldn't help but feel this case was appropriate to include in this round-up, despite already appearing in issue 83. So without further ado, let's get to the critiquing.

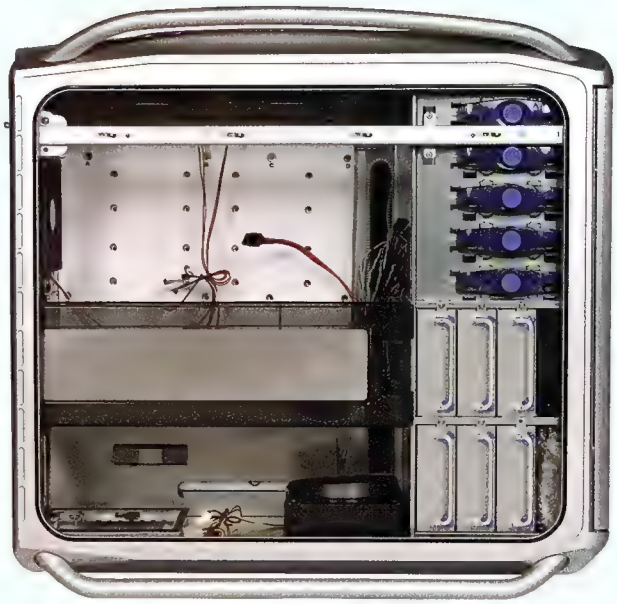
Starting with the fascia of the enclosure, the Cosmos 1000 presents a clean and stylish presentation. Using an aluminium super-structure with inset reflective black perspex in the centre of the structure, the case door offers a smooth and light movement while still maintaining a strong assembly.

The cooling layout is slightly modified from the usual front intake rear exhaust type scenario. To maintain the sleek front styling, the intake fan has been shifted to the bottom of the case, at the front. Additionally, a vent also sits below the power supply. At the rear is a single fan and placed nearby in the roof of the enclosure are an additional two fans. All fans in the Cosmos 1000 are of the 120mm variety and the almost obligatory water cooling grommets are present.

One expected element of a 'big case' is that it can provide plentiful amounts of drive storage. The Cosmos 1000 doesn't deviate far from the norm of the category, with four external 5.25in drive bays, one external 3.5in drive bay and six internal 3.5in drive bays. Where it gains some level of uniqueness is the way in which the internal 3.5in drive bays are implemented. Drive bays are arranged in a 3 x 2 configuration with caddies that slide in and out of a larger enclosure; great for those who want to pretend they're playing around with hot swappable Big Iron server drives.

Interior space and design is clean, open and well planned, with the only non-ATX style design being the placement of the PSU on the bottom of the case. Weighing in at 2.3kg, this case is a little heavier then most in the round-up but still manageable.

SCORE 7.5 OUT OF 10







Silverstone TJ07

Supplier www.altech.com.au
Street price $348

The winner of this round-up, and deservedly so, the TJ07 displays a stance of elegance, sophistication and strength.

This case utilises a single cast aluminium piece for the top, front and bottom facings; this not only adds to the sophistication and clean lines of the build, but also adds significant strength to the overall construction. Adversely, it also impacts upon the case's weight, tipping the scales to 2.1kg. Construction was superb; great care has been taken on every aspect of case detail, with beautifully rolled metal edges and rubber c-strips on edges likely to have cables routed through or nearby. Furthermore, the construction of the case is rivet-less with the exception of the motherboard plate. This lead to a surprise, however, as it was the only piece of the chassis that exhibited the ability to give off any sort of rattle when given a shove.

Sporting a total of four 120mm fans and two 92mm fans, the TJ07 certainly has cooling under control. The case split into two compartments; the lower section houses the PSU and HDD racks and features mesh on either side of the lower side panels. Two 120mm fans cool the area, blowing from left to right, taking full advantage of the mesh sides. For the top compartment, the rear 92mm fans suck air into the case, which is then extracted by the two top mounted 120mm fans.

Overall, the case features good depth both in the motherboard and PSU mounting area, and in general provides a spacious yet organised feel. The case features seven external 5.25in drive bays, one external 3.5in bay and six internal 3.5in bays – plenty for most storage needs.

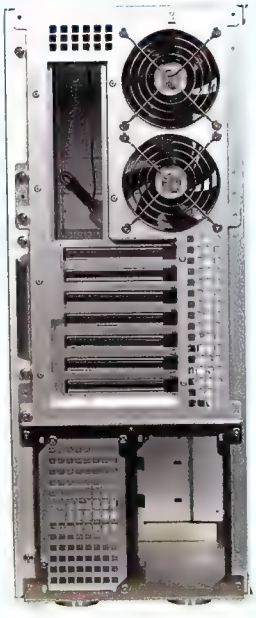
With smooth style and neat touches such as additional rubber-based metal stud feet, spare PSU orientation back plates and loads of screws, this case is pure win.

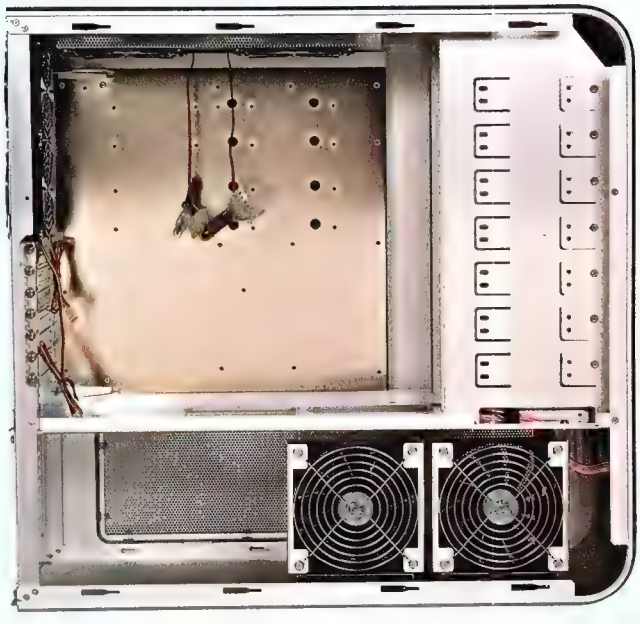
atomic hot award



SCORE **9.0** OUT OF 10







Lian Li PC-A71B



Supplier www.anyware.com.au
Street price $379

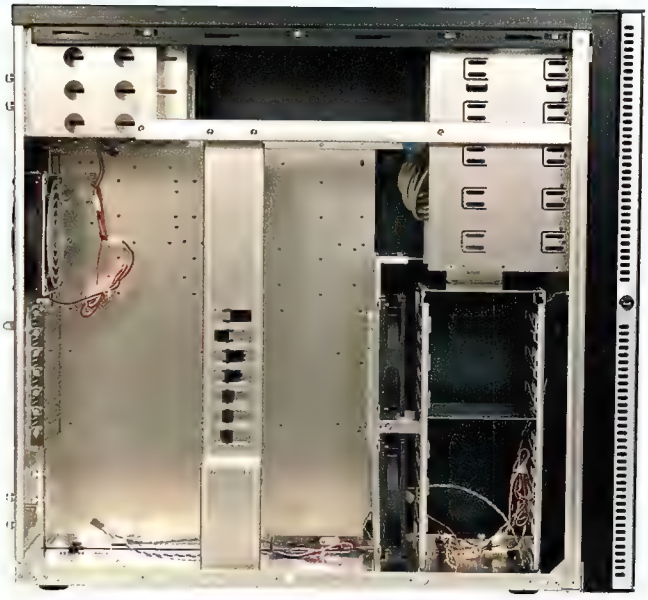
The Lian Li PC-A71B has the kind of shape and form that we can only compare to a miniaturised version of a super computer. Sporting five external 5.25in bays and ten internal 3.5in bays, this case could very well house a miniature super computer too. And while you might think that this bounty of storage possibility can only come at the expense of interior space, the truth is quite the opposite. The PC-A71B sports a spacious, clean and well laid out interior design, incorporating well-considered HDD placement, both at the front and rear, handily cooled by the equally well-designed fan layout.

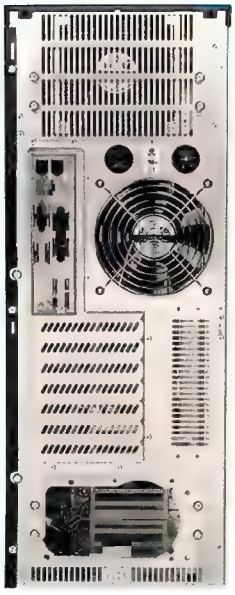
The case features a total of six 120mm fans, which is nearly the highest out-of-the-box fan count this test; the stock air cooling solution is very competent. Further cooling features include two grommets to allow the pass-through of water cooling tubing from an external source to the hardware inside this aluminium beauty. Unfortunately, this is one small area that Lian Li managed to drop a rather feather-weight ball. The grommets are a hard plastic which not only makes passing tubing through quite difficult but also doesn't get on with curious fingers either.

The general aesthetics of this beast adheres to the typical, and rather classical, Lian Li tower style. Whether you like this or not is a matter of taste; Lian Li's designs are often reserved for a more refined or older age bracket, avoiding clichéd and aggressive styling like that seen on the 3D Mars.

Weighing in at 1.55kg, the PC-A71B is one of the lighter cases in the round-up. We question whether this could be what makes the case give off an ever so slight rattle when given a bump and shove around. It's not a tank like the Silverstone TJ10, but at the same time it's not falling apart and features exceptionally high build quality.

SCORE **8.0** OUT OF 10







GIGABYTE 3D Mercury

Supplier **www.rectron.com.au**
Street price **$482**

Let's get one thing out of the way – the fascia of this case, like the 3D Mars, does not appeal to the Atomic team, but it does not mean others won't dig it. Perhaps the most off-putting elements of the fascia are the bulbous drive bay covers; they simply didn't look, well… right.

What is done well though is the front I/O panel, which features four USB ports, one Firewire port, the front audio and mic 3.5mm jacks, power and reset buttons as well as the LED notifications. So check, check and check for the usual suspects; but also on the panel is a flow indicator for the inbuilt liquid cooling kit, as well as a dial to control the radiator fan speed.

The water cooling kit built into the case consists of a CPU block, pump, and single 120mm radiator with two fans attached to it. Our greatest concern is the use of a copper CPU block and an aluminium radiator – hello galvanic cell and goodbye water cooling kit!

Drive space is sufficient though nothing overly expansive, like that in the Lian Li PC-A71B. The 3D Mercury sports only four internal 3.5in bays, two external 3.5in and four external 5.25in bays.

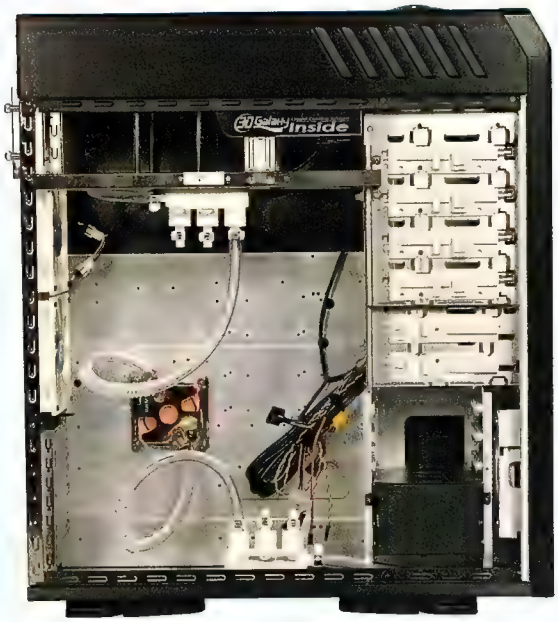
Interior space is good, though due to the water cooling gear we did feel a little cramped while we were working on this case. Internal design is very similar to that found in the 3DMars and 3DAurora, but does feature good structural support and rolled edges to assure no delicate geek hands are hurt.

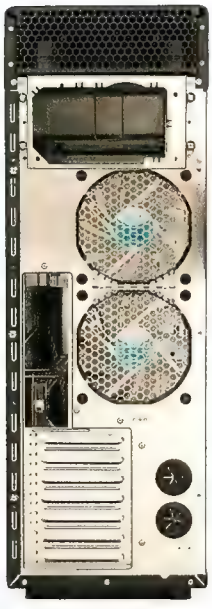
As we said, this is not a case that appeals from a purely aesthetic point of view; it does look a little cheap. A horrible example of this is the plastic, faux-metal screw cap for the water cooling fill port.

All in all, this case displays some strong elements but fails to bring them together with the same class and poise as seen in other cases.



SCORE **6.5** OUT OF 10







Silverstone TJ10B

Supplier **www.altech.com.au**
Street Price **$369**

This is the brutal sibling of the winning Silverstone case, all harsh square edges and etched stripes. The TJ10B makes no bones about being a solid and, dare we say, masculine case – hell, when we tried to shake it about to check the construction quality it punched a passing colleague in the junk!

When we recovered from the shock, we were at least pleased to find that this is another very solid case. The interior is clear of major obstructions, offering both easy access and better airflow; that said, airflow is a contentious issue with the TJ10B.

It comes stock with only two 120mm fans, the lowest fan-count in this test. The placing is problematic as well – the rear fan is pretty standard fare, but the intake fan is placed centrally, drawing air in via two vents on the side. This surely hinders proper throughput. On the upside, the case does feature rubber grommets in the case rear for water cooling functionality.

Our only other complaint is how stiff the cover of the top IO port is – we had to pry it open with a screwdriver to get to the USB, Firewire and audio jacks.

The TJ10B is also not the roomiest case when it comes to drives, but the drives it can handle are very cleverly housed. It can take six 3.5in HDDs, which sit in two slide-out drive bays with rubber mountings – it's a very elegant set up. Also elegant is the slide-out mobo backing tray, which makes mobo swap-outs for external, sub-zero overclocking sessions a much easier proposition.

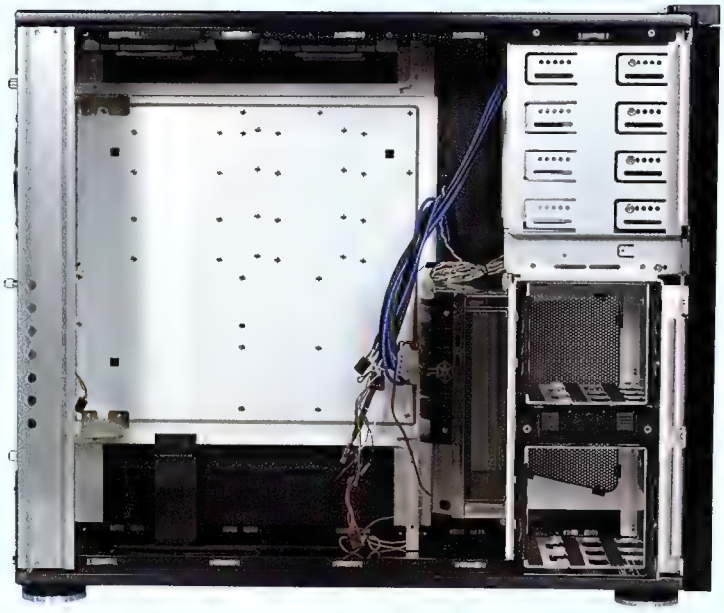
Silverstone's angry little guy is a bit of a mixed bag at the end of the day, but there's far more great ideas in this case than bad ones, and it is one solid piece of kit.

SCORE **7.5** OUT OF 10









Love at first sight...



CONTEMPORARY & INNOVATIVE IN WIN

www.in-win.com

INGRAM MICRO

Foxconn P35 Mars

SPECS

Price **$236**
Supplier **Foxconn**
Website **www.foxconn.com.tw**
Specifications **Socket 775; Intel P35 northbridge; ICH9R southbridge; ATX form factor; solid state capacitors; 2x PCIe x16; 3x PCI; 2x PCIe x1; 1x EIDE; 6x SATA II; 2x FireWire; 1600MHz FSB; DDR3-1333; 12x USB 2.0 (6x on rear I/O); 1x eSATA; 1x gigabit LAN**



Looking further afield from the OEM space, Foxconn has a new focus; an evolved focus, one that is set to put Foxconn on the map for a market yet to truly feel its presence – our market.

The Foxconn P35 Mars is the first to appear from the recently announced Quantum Force series of motherboards. These boards have been developed for the enthusiast market and with overclocking in mind. Wanting to assure they did the job right, as they've been renowned for doing in the OEM space, Foxconn hired established and well-respected world overclocker Peter 'Shamino' Tan as the Quantum Force Technical Consultant.

With this strong enthusiast influence the expectations were high. It's great to see manufacturers finally taking advantage of the expertise held by the enthusiast 'big boys' and it's similarly fabulous to see these high level enthusiasts gaining recognition for their hard work, research and ingenuity. But there's one big question – will it pay off in a publicly available retail product? Well, as enthusiasts and lovers of tech we can certainly and simply say "Hell yes".

The board offers features that we've come to expect from the best motherboards out there. These features include solid state capacitors, onboard on/off, reset and CMOS clear buttons, a plethora of I/O options, dual PCIe 16x solution and support for the latest 45nm CPUs from Intel. These top tier features are found in a nicely and neatly laid out package. A lot of work has gone into the positioning of parts within the board's layout.

It's ever so common to find oversights such as the DIMM slot clips obstructed by a long primary GPU, SATA ports blocked by primary and/or secondary GPUs, onboard switches blocked, yep, again by GPUs. This board manages to avoid all but the last of these three issues. But it's not a big issue as the onboard buttons are hardly unobtainable so all is good here too. Further adding to the layout considerations is the placing of the PCI slots in relation to the PCIe 16x slots. With a dual card dual slot cooling graphics monster setup, two PCI slots are still accessible.

Thrown through our benchmarks, the board performed on par with others in regards to FSB overclocking and memory tweaking capability, and excelled in not only being able to support the 'typical' overclock run in the labs but in doing so with less voltage necessary on certain parts such as north bridge and CPU v-core. One catch-22 worth mentioning at this point is that, although using less CPU v-core to hit a given frequency, the board did demonstrate some sizeable v-core drop, roughly 0.027v below the BIOS set value. In turn, this meant higher values were necessary to achieve a desired v-core.

Onto the results and the board demonstrated some best-in-class results – much faster than the previous P35 champ, the DFI P35-T2R. How much faster? In the Super Pi 4M benchmark; a whopping 0.734s faster! For such a gain to be seen from a motherboard is generally due to tight MCH latencies, and allows for more efficient communication between the CPU, MCH (north bridge) and memory.

The Foxconn P35 Mars finishes a sweet deal with a max 565MHz FSB on the labs processor and a truly killer price of $236!

We're in love. **JC**

	333x9; DDR2-1000 4-4-4-10 2T	500x6; DDR2-1000 4-4-4-10 2T	550x6; DDR2-1100 4-4-4-10 2T
Super Pi 4M	1m 30.485s	1m 28.921s	1m 21.312s
wPrime 32M	29.093s	29.078s	26.484s
3DMark06 CPU Score	2707	2722	2989
CineBench – single thread	3064	3073	3385
CineBench – multi-thread	5885	5907	6489
Everest Read	8562MB/s	9577MB/s	10365MB/s
Everest Write	6079MB/s	7948MB/s	8754MB/s
Everest Latency	63.6ns	84.3ns	79.5ns

SCORE 9.5 OUT OF 10

Phenom X4 9900

Josh Collins decides whether Phenom is phenomenal or just another stop gap.

SPECS

Price **$353**
Supplier **AMD**
Website **www.amd.com**
Specifications **2.6GHz quad core; 65nm manufacturing process; 4 x 512KB L2 cache; 2MB L3 cache; 13x multiplier; 140W TDP.**



With the clichéd Phenom-phenomenal word play out of the way, let's get stuck into the ins, outs and all abouts of the newly released quad core from AMD.

This quad core processor marks the end of a very, very, very long wait. Following delay after delay we appear to now have a functioning quad core processor from AMD; or do we? The first bit of info to be passed to the pages of black and green is that there is a bug within the L3 cache, in the Translation Lookaside Buffer (TLB) to be more accurate. This was found in the initially launched Phenom processors; hence the delay on the flagship Phenom X4 9700 hitting the retail market.

This TLB erratum has been the cause for much concern; in rare circumstances when all four cores are being utilised and large amounts of memory transactions are made the system can lockup. This issue is currently rectified through the use of a BIOS-level workaround for the TLB erratum and there are patches to achieve the desired effect – complete system stability. Unfortunately, this patch incurs a roughly 20 per cent performance hit compared to the non-patched performance. This issue is said to be rectified in a silicon level fix in the B3 stepping processors ear-marked for release in Q1 this year. I guess it's too bad we've got the yet to be released Phenom X2 9900 and it's a B2 stepping sample – oh well, on with the testing.

We chose not to install the BIOS-level workaround, however. Why? Because we wanted to see the true impact of this rare issue and whether it would hinder our testing and, well, it didn't. That's not to say that the fix isn't necessary as it's possible that the issue may raise its ugly head in other, more long-term circumstances; but at least within our experience we did not come across the problem.

The Phenom line of processors is obviously the first line of quad core processors from AMD. What makes these new chips unique is not just that they're the first of their breed, but rather that the design is the first to house four cores on a single silicon die. Intel quad cores utilise a multi-chip module (MCM) solution, placing two dual core dies within a single package, thus constructing a quad core processor. Although this approach is an advance for micro-processor design and technology, it inherently causes issues in areas such as yield quantities. This is where the Phenom triple-core concept is thought to have been born; that said, neither enthusiasts nor media have had a confirmation of the Phenom triple-core variety from AMD as merely being Phenom quad-core chips with failed cores disabled.

Anyway, what can this puppy do? Being a stock 2.6GHz part, the chip bares a 13x multiplier at stock on a 200MHz HTT bus (FSB for the Intel fans). The Phenom X4 9900 we used had an unlocked multiplier with 0.5x increments available for scaling. As such, we decided it was important to test the two sides of the overclocking coin. We wanted to know what max overclocks were like as well as performance by utilising both HTT overclocking and multiplier overclocking to achieve the biggest possible numbers.

The end result of the two schools of overclocking going head to head was the HTT maxing out at 235MHz and using the multiplier we maxed out the overclock at 15.5x the stock HTT of 200MHz. The 16x multiplier would begin to boot but would then fail upon loading Windows as the heat started to skyrocket – these chips run hot, featuring a 140W TDP at stock; overclocking just makes things much, much worse.

Combining the power of HTT and multiplier overclocking we maxed out at 230x13.5. It's important to mention at this point that due to the isolated memory controller of the Phenom, which is not influenced by the HTT frequency, we obtained the best overclocking results by simply utilising the multiplier.

All in all we found this chip to be hotter and slower than the 65nm Core 2 Quads, let alone the 45nm Core 2 Quad processors, with restrictive memory frequencies; to top things off we aren't likely to see the B3 chips until Q1 '08. **JC**

	200x13; DDR2-800 4-4-4-10 2T	200x14; DDR2-800 4-4-4-10 2T	200x15; DDR2-800 4-4-4-10 2T	200x15.5; DDR2-800 4-4-4-10 2T
Super Pi 4M	2m 33.640s	2m 25.360s	2m 17.110s	2m 13.531s
wPrime 32M	19.312s	15.234s	14.25s	13.797s
3DMark06 CPU score	3983	4146	4428	4547
CineBench – single thread	2243	2343	2498	2560
CineBench – multi-thread	6274	8975	9630	9909
Everest Read	7758MB/s	7191MB/s	7319MB/s	7320MB/s
Everest Write	5050MB/s	4889MB/s	5149MB/s	5137MBs
Everest Latency	55.5ns	58.6ns	57.1ns	57.3ns

Abit IP35

Josh Collins avoids the dark raider and takes the IP35 for a spin around the block



SPECS

Price **$149**
Supplier **Altech**
Website **www.altech.com.au**
Specifications **Socket 775; Intel P35 northbridge; ICH9R southbridge; ATX form factor; 1x PCIe x16; 3x PCI; 2x PCIe x1; 1x EIDE; 6x SATA II; 2x FireWire; 1333MHz FSB; DDR2-800; 8x USB 2.0 (4x on rear I/O); 1x gigabit LAN**

With the words on the box stating 'dark raider', we couldn't help but wonder whether we're going to open the box to a piece of silicon with electronics scattered all over it or some gothic horseman of the night ready to decapitate us, continuing on to then take our woman. With our shotgun ready, we opened it.

What we found was the quaint IP35. A budget level motherboard from the folks at Abit and at least from first glance we felt we needn't worry about any romance-novel-cover marauder.

The board is fairly feature-packed for the relatively cheap price of $149. There are six SATA II ports connected to the ICH9R south bridge – RAID, two FireWire ports, one PCIe 16x slot and a gigabit LAN connection; this board is set to provide a high level of connectivity, interaction and immersion for solid value.

Obviously, being a budget board, there are features that are either reduced or removed completely when compared to its fully fledged brethren, the IP35 Pro. Such features include the secondary PCIe x16 slot for CrossFire support, support for DDR2-1066 memory at stock, eSATA, the uGuru overclocking utility and dual Ethernet.

We thought this would leave the Abit IP35 in good stead for battle within the market; then we checked out the other two big boys in the budget sandbox. ASUS and GIGABYTE have two extremely competitive boards within the $140 to $170 price bracket in the form of the P5K and P35-DS3P respectively. Both pack a punch with a clear difference between those boards and the Abit offering; the P5K and P35-DS3P include support for two PCIe 16x slots, all solid capacitors and the capacity to overclock past 500MHz, even 550MHz or further given the right conditions and a good processor.

Using a chip known to hit just shy of 600MHz FSB we tested the Abit IP35 and were disappointed to say the least. The board struggled with FSB overclocking, managing a mere 400MHz FSB and a max of 425MHz FSB that could only be obtained by utilising SetFSB to raise the FSB from within Windows. No 500+MHz front side bus system here, ladies and gents.

Not only were the FSB limits a disappointment, but solid state capacitors are only used around the socket and MOSFET area – at least they were used here, rather than not at all. When up against other brands utilising solid state capacitors over the whole board, it does make it harder to compete. To put the final nail in its own coffin, Abit then implemented only four-phase power for the CPU socket. This has an adverse effect on the clean and uninterrupted power supply to the CPU; this is especially important when considering stable overclocks.

With the board generally restricted to low FSB frequencies and lower dividers compared to high-end motherboards, the saving grace should be memory tweaking. Well, that's your problem, right there – the board has no option to run a CAS3 latency. Oddly, this lack of optimal numeration is only on the CAS latency setting (tCL) while tRCD and tRP can be set down to a value of three. Also odd was the lack of tRAS options, with the lowest value being nine – again, it's obvious no one's going to be running DDR2-800 3-3-3-8 on this board! This type of memory performance was once set aside for those with deep pockets but with Micron D9 based DDR2 being excessively cheap, quality sticks can be found for a bargain.

The board starts as a stealthy knight, but then fades to the level of court jester all too quickly in the presence of the big boys. **JC**

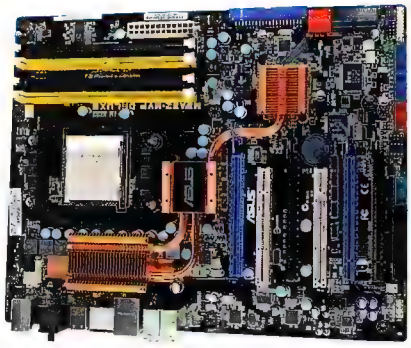
	333x9; DDR2-1000 4-4-4-10	375x8; DDR2-936 4-4-4-10	400x7; DDR2-1000 4-4-4-10	425x7; DDR2-1064 4-4-4-10
Super Pi 4M	1m 30.610s	1m 31.203s	1m 35.500s	1m 29.906s
wPrime 32M	29.172s	29.046s	31.172s	29.407s
3DMark06 CPU Score	2714	2715	2543	2702
CineBench – single thread	3071	3070	2879	3050
CineBench – multi-thread	5882	5906	5510	5847
Everest Read	8489MB/s	8560MB/s	8902MB/s	9442MB/s
Everest Write	6082MB/s	6841MB/s	7288MB/s	7712MB/s
Everest Latency	63.7ns	71.3ns	79.0ns	74.3ns

SCORE **6.0** OUT OF 10

ASUS M3A32-MVP Deluxe

SPECS

Price $317
Supplier ASUS
Website www.asus.com
Specifications Socket AM2+; 790FX north bridge; SB600 south bridge; ATX form factor; 4 x PCIe x16; 2 x PCI; 1x EIDE; 6 x SATA II; 2 x FireWire; Phenom support; DDR2-1066; 10 x USB 2.0 (6 x on rear I/O); 1 x gigabit LAN



Four graphics cards and support for four cores; this motherboard has gone one better than a threesome on both accounts.

The ASUS M3A32-MVP Deluxe, other than having an annoying product name, sports the recently released 790FX north bridge from AMD. This new chipset brings a number of new features to the table. These features include 42 dedicated PCI Express lanes directly from the north bridge, HyperTransport 3.0 with support for HTX, PCIe 2.0 support, four physical PCIe x16 slots, and with this the ability to run CrossFire X.

The inclusion of the 790FX chipset makes the motherboard one of three pieces needed to construct the AMD 'Spider' platform. This platform is specified to include a 790FX based motherboard, Phenom 9000 series quad core processor and ATI Radeon HD3800 series GPUs. The GPUs, due to the four physical PCIe x16 slots can be arranged in a traditional two card CrossFire configuration with two 16x electrical connection or can also be set up in the new CrossFire X configuration. CrossFire X supports either three or four cards in a multi GPU arrangement. In this layout, the slots revert from 16x electrical to 8x electrical so as to feed the extra GPUs. This results in either a 8x+8x+8x or 8x+8x+8x+8x system.

Supplying all of these packages into one tidy board, the M3A32-MVP Deluxe offers a solid basis for the Spider platform. This support comes in the form of 8+2 phase power control for the socket area – eight for the CPU and two for the HT link. This is a well laid out board designed to assure optimum PCIe x16 layout for multi GPU support, Phenom 9000 series support and use of all solid state capacitors.

The ASUS M3A32-MVP Deluxe is a strong building block for AMD's current flagship platform. JC

	200x13; DDR2-800 4-4-4-10 2T	200x14; DDR2-800 4-4-4-10 2T	200x15; DDR2-800 4-4-4-10 2T	200x15.5; DDR2-800 4-4-4-10 2T
Super Pi 4M	2m 33.640s	2m 25.360s	2m 17.110s	2m 13.531s
wPrime 32M	19.312s	15.234s	14.25s	13.797s
3DMark06 CPU score	3983	4146	4428	4547
CineBench – single thread	2243	2343	2498	2560
CineBench – multi-thread	6274	8975	9630	9909
Everest Read	7758MB/s	7191MB/s	7319MB/s	7320MB/s
Everest Write	5050MB/s	4889MB/s	5149MB/s	5137MBs
Everest Latency	55.5ns	58.6ns	57.1ns	57.3ns

SCORE 7.5 OUT OF 10

Patriot DDR3-1866 C8

SPECS

Price $763
Supplier Patriot
Website www.patriotmem.com
Specifications DDR3-1866, 8-8-8-20; PC3-15000; 1.9v operating voltage; Micron ICs; 2x 1GB kit; 240-pin DIMM; Non-ECC; Unbuffered DDR3; limited lifetime warranty.



Patriot is a well known and respected force within the North American market. We last had a product from Patriot in issue #81 in the form of the top level DDR2 kit, the low latency DDR2-1200 5-5-5-12 model. Now, further enforcing its push into the Australian market, Patriot has provided a kit of low latency DDR3-1866 modules rated for 8-8-8-20 memory timings.

These kits are based on Micron D9GTR ICs and are rated to operate on 1.9v, 0.4v above that of the DDR3 JEDEC-approved standard of 1.5v. Again, this carries the hallmark of Micron D9 based memory, as seen in the DDR2 kits rated for anything from 0.4v to 0.65v above the JEDEC-approved DDR2 standard of 1.8v. This extra voltage is a strong contributor to the Micron D9 IC's ability to reach the phenomenal frequencies and latencies that it does.

These particular sticks are the highest frequency modules we've put through the labs. Rated for DDR3-1866, 66MHz higher frequency at stock speeds than the Corsair Dominators reviewed in issue #84. This extra 66MHz appears to come at a cost, however. The modules are running at a higher CAS latency in comparison to the Dominators – CAS8 opposed to CAS7 respectively.

Being the hardware mongrels we are and knowing that both kits had Micron D9 ICs in them, we saw no reason as to why the Patriot sticks couldn't join the Corsair kit at DDR3-1800 7-7-7-20 and what'd ya know, they did it. Not only that, they pulled right through to DDR3-1960 7-7-7-20. Unsatisfied we then pushed the lengths of the stock rated CAS8 and lower CAS6 and CAS5 timings. Doing so, we obtained DDR3-1980 8-8-8-20, DDR3-1700 6-6-6-18 and DDR3-1333 5-5-5-15.

These modules offer great performance and come quite close to the Corsair Dominators; but for the price the Corsair kit offers better overall value. JC

SCORE 8.0 OUT OF 10

IF A FRIEND TELLS YOU LIFE SUCKS

TELL THEM WHERE TO GO



reachout.com.au
Log on if life could be better

Sapphire HD3870

SPECS

Price **$353**
Supplier **Sapphire**
Website **www.sapphiretech.com**
Specifications **775MHz core; 1125MHz memory (2250MHz effective); 512MB GDDR4; 320 stream processing units; 55nm manufacturing process; RV670 core; single slot cooling; single 6-pin PCIe power connector**



This card is the XT version of the RV670 core and like its HD3850 brethren; the HD3870 features a 55nm manufacturing process, 320 stream processing units, 512MB of GDDR4 memory, a dual slot cooler and a single 6-pin PCIe power connector.

Technically very similar to the HD3850, the HD3870 separates itself by having an additional 256MB of GDDR4 and higher clock speeds of 775MHz core and 1125MHz memory (2250MHz effective) opposed to the RV670 Pro speeds of 669MHz core and 829MHz memory (1658MHz effective).

These subtle changes funnily enough also bring only a subtle increase in performance, but one that is none the less noticeable. The card scored 10,698 in 3DMark06, while in *Crysis* testing the card pulled in 17.55, 8.72 and 14.39 for the maximum, minimum and average FPS respectively at a resolution of 1280x1024, with no AA, no AF and all settings on 'very high' with DX10 visuals.

Like its little brother, the HD3870 from Sapphire provides a killer bundle of software with 3DMark06, PowerDVD 7, DVD Suite 5, a *Black Box* license from Valve and the necessary program, Steam, included on the driver disc with the Catalyst 7.11 drivers. As for the hardware peripherals, the normal array is there with TV-out breakout cables, DVI to DSUB converters and one of the two necessary CrossFire bridges should you choose to go down that path – the second would be obtained from the purchase of the second card.

Sitting in a rather nasty price zone, this card is forced to compete with some of the cheaper 8800GT cards – that is if you can get stock of the 8800GT. With some retailers pushing the price of this card north of $400, this once again adds to the confusion as to what to buy in this price bracket. Should a buyer wait it out and purchase an 8800GT, which is significantly faster, or look for an alternative in the form of the HD3870? This is the question many enthusiasts are facing.

In the end, it appears that the $325 to $450 price bracket is going to be dominated by availability rather than the actual product choice and performance. **JC**

SCORE 7.0 OUT OF 10

Sapphire HD3850

SPECS

Price **$250**
Supplier **Sapphire**
Website **www.sapphiretech.com**
Specifications **669MHz core; 829MHz memory (1658MHz effective); 256MB GDDR4; 320 stream processing units; 55nm manufacturing process; RV670 core; single slot cooling; single 6-pin PCIe power connector**



This is the recent budget refresh to the 80nm based R600 core, known to the retail and channel world as the HD2900XT. Floating in with a cool new 55nm manufacturing process based on the RV670 Pro core, and featuring a single slot cooler and cheap price-point, the HD3850 is aimed squarely at the budget market.

Sapphire has been a leading supporter of the ATI faction for many years now and it's no surprise it was first to bring the HD3850, and the HD3870 for that matter, to the market. Dressed as a reference ATI card but with a sticker of Ruby, the card is more or less a reference design from ATI. From frequencies to components to PCB layout, it's a stock ATI reference offering.

The card offers exceptional value for money, however, with strong performance and a great bundle. Powering through the benchmarks, this budget killer knocked out 9,544 points in 3DMark06 and a maximum, minimum and average FPS in *Crysis* of 14.63, 7.10 and 11.45 at 1280x1024 resolution and all settings set to 'very high' with DX10. For a budget card, it quite simply wipes the floor with every other card type in the same price category.

The HD3850 may not have the raw performance that the 8800GT has but at anywhere from $100 to $200 cheaper, this card very quickly has preference swing into its field – and we've not even looked at the tasty extras yet.

As we said, the bundle is tops and that's because it includes, a driver disk, additional cables and DVI to DSUB connectors, as well as a colossal software package. This includes licenses for PowerDVD 7, Cyberlink DVD Suite 5, the full version of 3DMark06 and a license for Valve's *Black Box* collection – score! This *Black Box* license, when paired with a free Steam login and the installation of Steam on the computer, which just so happens to be on the driver disk, gives the ability to download and own full versions of *Half Life 2: Episode Two* as well as its pals, *Team Fortress 2* and *Portal*. That, ladies and gentlemen, is value for money!

Add to the pot the fact these cards are known to be solid overclockers and you have, right in front of you, a whole package ready to aggressively take on the market. **JC**

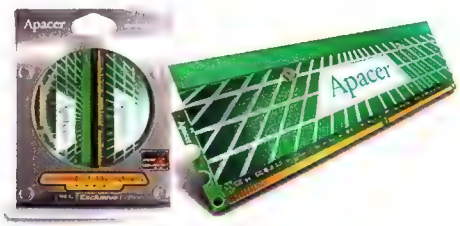
SCORE 8.0 OUT OF 10

Apacer

Access the best



Overclocking Memory Series



WCG

WORLD CYBER GAMES

Exclusive Edition

CROSS FIRE CERTIFIED

LIFETIME WARRANTY

Features:

- Designed especially for gaming PCs
- Adopts a giant extruded aluminum heat sink for cooling
- Apacer's Overclocking Series memory use top-quality DRAM chips and supported by major IC manufacturers
- Highest quality and performance certified by ATI CrossFire™
- Supports EPP (Enhanced Performance Profiles) Standard
- Official module at the World Cyber Games (WCG) 2006 Italy
- Lifetime Warranty

Data rate	Model	Capacity	Configuration	Description	Voltage	CL	Pin	Bandwidth
DDR2-1200	PC2-9600	1GB Kit (512MBx2) 2GB Kit (1GBx2)	64x8	Unbuffered DIMM	2.1V	5-5-5-15	240Pin	9600 MB/Sec
DDR2-1066	PC2-8500	1GB Kit (512MBx2) 2GB Kit (1GBx2)	64x8	Unbuffered DIMM	2.2V	5-5-5-15	240Pin	8500 MB/Sec
DDR2-800	PC2-6400	1GB Kit (512MBx2) 2GB Kit (1GBx2)	64x8	Unbuffered DIMM	2.1V	4-4-4-12	240Pin	6400 MB/Sec

Authorised distributor

bluechip Infotech

Distributed by Bluechip Infotech Pty Ltd
For your nearest stockist call 1300 727 474
Website: www.bluechipit.com.au

www.apacer.com

XFX 8800GTS 512MB Alpha Dog Edition



SPECS

Price **TBC**
Supplier **XFX**
Website **www.xfxforce.com**
Specifications **G92 core micro-architecture; 128 stream pipelines; 678MHz core; 986MHz memory (1972MHz effective); 1700MHz shader; 512MB GDDR3; dual slot cooling solution; single 6-pin PCIe power connector**

Another month gone, and another G92 variant put through its paces in the labs. This time around it's the beefier 8800GTS 512MB coming in to officially replace the 8800GTS 640MB and, unofficially, everything else.

Before we jump into things, it's important to give the 8800GTS 512MB some closer analysis and define the differences between it and the already available (or not for those still waiting on back orders!) G92 variant, the 8800GT. First off, the GTS 512MB features an extra 16 stream pipelines, for a total of 128 compared to the total of 112 found in the GT 512MB. To back this up, the stock core clock on reference GTS 512MB has been bumped to 650MHz in comparison to the GT 512MB reference stock of 600MHz – our sample however is stock overclocked to 678MHz.

Continuing with the differences, the shader clocks have been bumped up to 1625MHz above the 1500MHz frequency of the GT 512MB. Again, our XFX card is stock overclocked, with a 1700MHz shader. To add further distinction, the new memory clocks are 970MHz as opposed to 900MHz – and yup, our card is overclocked here, too, with a stock 986MHz. Interestingly the GDDR3 memory used on the 8800GTS 512MB is the same as used on the 8800GT 512MB – Qimonda branded ICs rated for 1GHz (2GHz effective) frequency. Last but not least, the new 8800GTS 512MB is physically different, sporting a new dual socket heatsink fan design, following a higher stock thermal output of 130-140W. Also changed, this time compared to the GTS 320MB and 640MB cards, is the move to a 256-bit memory bus compared to the previous 320-bit bus so as to match the amount of memory now used.

We put Alpha Dog through the labs testing suite and found it quite competent to say the least. The card pushed out an impressive 12,592 points in 3DMark06 and a maximum, minimum and average FPS in *Crysis* of 23.38, 13.30 and 19.94 respectively.

The folks at XFX have also bundled a copy of Capcom's *Lost Planet* game as well as the usual plethora of cables, DVI to DSUB converters and the requisite driver disc.

Whether for gaming or pushing the boundaries of benchmarks, the XFX 8800GTS 512MB Alpha Dog Edition is the new kid on the block and offers a competitive option in the market; however an overclocked GT may end up being a better bang for buck solution. **JC**

SCORE 8.0 OUT OF 10

ECS 8800GT 512MB



SPECS

Price **TBC**
Supplier **ECS**
Website **www.ecs.com.tw**
Specifications **680MHz core; 990MHz memory (1980MHz effective); 1728MHz shader; based on G92 core; 112 stream pipelines; dual slot passive cooling solution; single 6-pin PCIe power connector**

This is one of the first non-reference 8800GT cards to hit the labs, and it's passively cooled to boot! This offering from ECS steps it up even further by supplying a stock overclocked card. Phew, now let's hope she lives!

With a stock core frequency of 680MHz, memory at 990MHz (1980MHz effective) and with the shader clock sitting at a cosy 1728MHz, the card is, oddly enough, one of the fastest on the market. Why do we say it's odd? It's freakin' passively cooled!

With the cooling method and stock overclocked frequencies in mind, we couldn't help but to be worried about the heat generated and the possible adverse effect this could have on the card. During our testing, particularly during the 3DMark06 runs, we were super-careful and used the ol' touch-o-meter that is the index finger to get a feel for how much heat this card was being forced to deal with. The main heatsink itself wasn't an issue. It was warm but not toasty, and certainly nowhere near melting point. If only the same could be said for the memory sinks – ouch; quite literally.

The cooling solution for the core is sufficient but the memory cooling, with no nearby airflow, leaves behind a sweltering area of warm air, hot metal heatsinks and, ultimately, a baking IC. With a fan placed nearby to blow directly onto the card we instantly saw, and felt, a drop in temperatures. While the silent running card was a welcomed change for our aural experience, we couldn't help but think that the quality of the card's visual output would not last the test of time given the heat the memory ICs were enduring.

Sporting some of the highest stock frequencies we've had through the labs – fourth fastest to be exact – we obviously wanted to know what kind of pixel pushing power this hot little card was capable of. Scoring 12,596 in 3DMark06 and pulling off scores of 24.56, 14.48 and 20.15 for the maximum, minimum and average FPS in our *Crysis* benchmark, the card has truly proven its worth.

A silent card, a fast card and very much a hot card; this submission from ECS is a solid piece of kit if you've got the case airflow to support it. **JC**

SCORE 7.5 OUT OF 10

Big Willy in action

David Field cackles maniacally and plunges half of North Sydney into darkness.

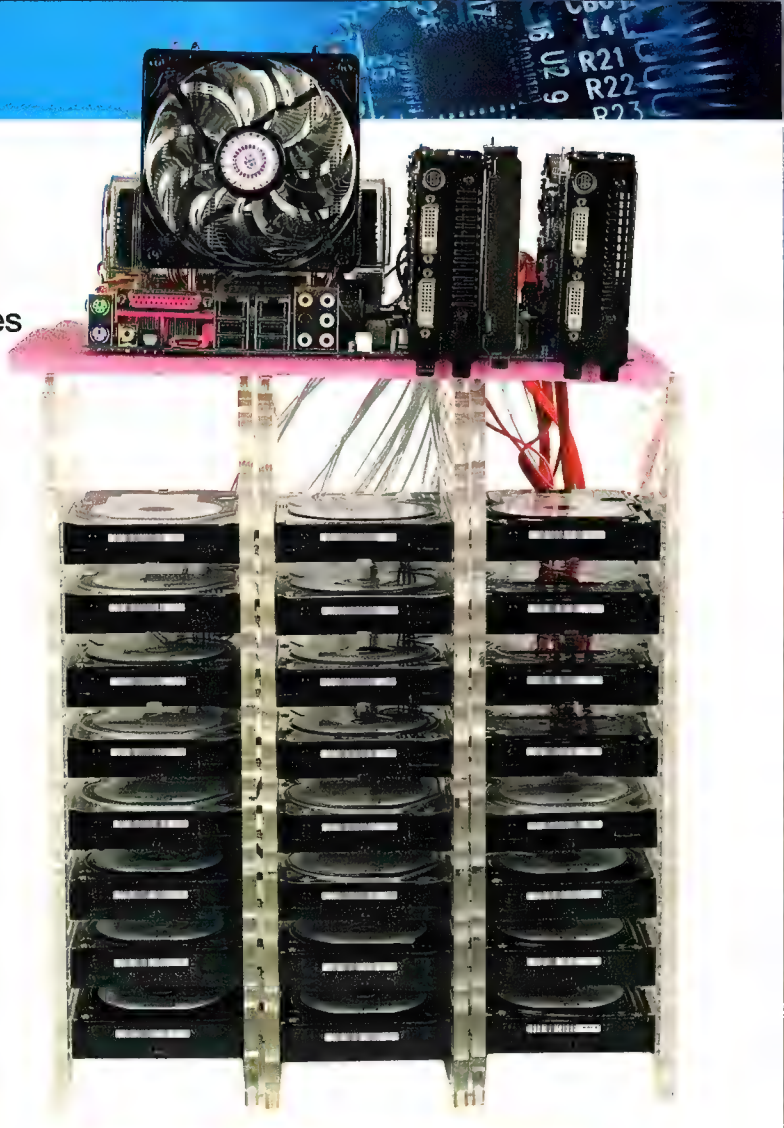
So what is it?

We've built the biggest single computer we could to see what happens to beefy power supplies when they are faced with a legitimately massive power draw.

Big Willy is 16 500GB Western Digital hard drives driven by an Adaptec 31605 SAS controller card and a further eight Raptors controlled by the Asus L1N64-SLI motherboard, which is home to two dual core FX-72 processors, 4GB of RAM, an 8800GTX and an 8800GTS.

Unfortunately, thanks to a slightly flaky engineering sample motherboard, we couldn't get SLI working. But the motherboard does let us use two processors, and their excessive power draw compensates for the lack of SLI: especially when you consider that traditional SMP processing has been sidelined in favor of dual and quad cores on a single processor.

By the time we were done, there were no more motherboard connections. We couldn't connect anything else to one computer, so we're considering this the ultimate power requirement saturation point. Run HD Tach, 3D Mark 06 and Orthos SuperPi simultaneously, and you have to ask the PSUs on the market today one question: can you power Big Willy? Well can you, punk?



Silverstone Decathlon

Weighing in at a monstrous 1200 watts (and a monstrous 3.4 kilograms) the Decathlon had no problems posting or running any of our benchmarks.

BIG WILLY CERTIFIED

This is mostly because of its specifications: it claims to deliver an epic 90 amps through its single 12 volt rail, as well as 40 amps through the 5 volt rail and another 40 through the 3.3 volt rail. Throughout our tests, we've found that single rail power supplies perform better than their multiple rail cousins, and this is the only 1KW and above PSU that uses a single 12 volt rail.

The only real problem we can see is how exactly you could harness the extra 12 volt headroom. It's unlikely any system will draw close to as much power as we've seen it deliver. What's more, with manufacturers doing their best to make their new hardware draw less power in an effort to keep heat down and Al Gore happy, it's easy to class the Decathlon as excessive.

Of course, you could consider modding your case to include a cigarette lighter, or power several kilometers of fairy lights, or a beer fridge of some description. Mmm, beer.

SPECS

12V1 - 90A	
5V - 40A	
3.3V - 40A	$395

Hiper Type R770W

We were worried we wouldn't see any mid-range power supplies struggle, but the Hiper Type R proved us quite wrong. It struggled to spin up the sixteen 7200RPM drives, and when we added a single 10K Raptor to the mix we were only able to POST 50 per cent of the time.

BIG WILLY CERTIFIED

We had to give it a leg up by disconnecting the power to half the drives running off the RAID card, then plugging them in a few seconds later to stagger the power draw at startup. Once in Windows and still unsatisfied, we connected two more drives before we started the quest for a really big value of Pi, only to have the system lock up on us.

While we were testing we saw a miracle-powered 750W power supply complete all our tests with all our drives connected, and we'll be reviewing it next issue. But it's safe to assume that the Hiper's 12V line – which was provided by four 12v lines and sagged to worryingly low voltages under high load – is its Achilles heel.

For normal systems it'll do the job, but for monster systems all you need to know is that it has officially become the first PSU to be slapped down by Big Willy.

SPECS

12V1 - 16A	12V4 - 18A	
12V2 - 16A	5V - 30A	
12V3 - 16A	3.3V	$189

LEADTEK

Power to You Absolute Pro!

WinFast® PX8800 GT / GTS Series

WinFast® PX8800 GT - 256MB 256bit GDDR3

- NVIDIA® GeForce® 8800 GT GPU
- GPU/Memory Clock at 600/1800 MHz
- Microsoft® DirectX® 10.0 Shader Model 4.0
- Support Dual Dual-Link DVI and HDTV
- Smoothly playback H.264, MPEG-2, and WMV video-including WMV HD

WinFast® PX8800 GT 512MB Zalman

- NVIDIA® GeForce® 8800 GPU
- GPU/Memory Clock 650/1800 MHz
- Ultra Quiet Cooler
- Automatic Fan Speed Control
- All Solid Capacitor Design



WinFast® PX8800 GTS - 512MB 256bit GDDR3

- NVIDIA® GeForce® 8800 GTS GPU
- GPU/Memory Clock at 650/1950 MHz
- Microsoft® DirectX® 10.0 Shader Model 4.0
- Support Dual Dual-Link DVI and HDTV
- Smoothly playback H.264, MPEG-2, and WMV video-including WMV HD

Certified for Windows Vista™ · PCI EXPRESS · NVIDIA SLI READY · NVIDIA PureVideo HD · RoHS READY

ALTECH COMPUTERS
Altech Computes
www.altech.com.au
SYD (02) 8831 9999 · MEL (03) 0558 5090
BRIS (07) 3017 2000 · PER (08) 9242 8822

Multimedia Technology Pty Ltd
www.mmt.com.au
(03) 9837 2500
End Users 1-300-650-003

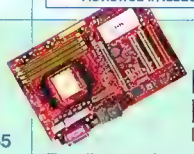
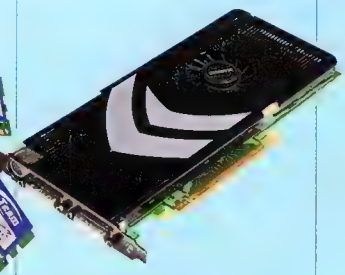
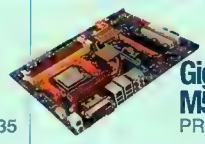
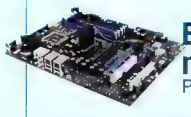
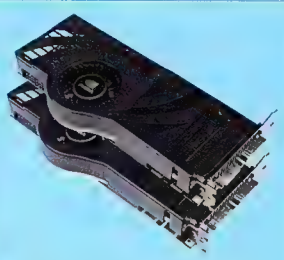
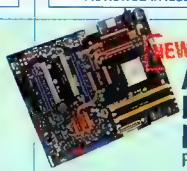
rectron
Rectron Electronics Pty Ltd
www.rectron.com.au
SYD +61-2-9352-0112 · MEL +61-3-8545-2883
PER +61-8-9330-7666

iWay
iWay Computer (NZ) Ltd
www.iway.co.nz
(09) 625 0099

ATOMIC KITLOG

Our choice for the best gear the land has to offer

There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay, just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in *Atomic*, so if you want to learn more, look up the issue and page number listed.

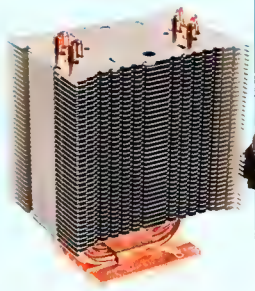
	CPUs	Motherboards	Memory	Video cards
BUDGET *I can't afford to eat... gimme gear!*	**intel**			
	Intel Core 2 Duo PRICE $100-$480 Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E4400 is the cheap ticket to speed, at $165.	 **GIGABYTE GA-G33M-DS2R** PRICE: $132 Using the G33 northbridge and has overclocking performance like its full ATX brethren, this Micro-ATX offering is extraordinarily hard to pass up. Reviewed in *Issue 81 – Page 52*	 **Corsair Twin2X 1024MB 6400 Pro** PRICE $198 Corsair has a history of providing nice, stable and fiesty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of fun for everyone! Reviewed in *Issue 69 – Page 51*	 NEW ENTRY **Sapphire HD3850** PRICE $250 A great budget choice with some serious pixel-pushing chops, and an oustanding package of must-play games. Reviewed in *Issue 85 – Page 53*
	AMD			
	AMD Athlon 64 AM2 X2 PRICE $135-335 Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ is your budget baby at about $85.	 **MSI K9N Neo F** PRICE $113 Excellent performance from a budget board, with plenty of legacy slots for upgraders. Don't expect to overclock though. Reviewed in *Issue 68 – Page 33*		
PERFORMANCE *Hardware that bangs the best for buck.*	**intel**			
	Intel Core 2 Quad PRICE $300-680 Core 2 Quad – a processing powerhouse, now affordable and overclockable like buggery. The Q6600 is the best buy, at about $336.	 **Foxconn P35 Mars** PRICE $236 NEW ENTRY A great board for the enthusiast with a mess of great ideas and good overclocking potential. Reviewed in *Issue 85 – Page 48*	 **TEAM Xtreem Dark PC2-6400 C4** PRICE $289 Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAMand enthusiast overclocking kits. Reviewed in *Issue 80 – Page 56*	 **GeForce 8800GT 512MB** PRICE $390 We are stunned at the price performance ratio of all the GT-based cards, but none caught our attention like this solidly benching mo-fo. Reviewed in *Issue 84 – Page 36*
	AMD			
	AMD Athlon 64 AM2 X2 PRICE $135-335 The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 6000+ is your current sweet spot at about $235.	 **Gigabyte GA-M59SLI-S5** PRICE $250 Gigabyte delivers yet another affordable, feature-filled wonder of the 21st century. Reviewed in *Issue 66 – Page 39*		
EXTREME *Gimme power. Money is no object.*	**intel**			
	Intel Core 2 Extreme QX9650 PRICE $TBC The cream of the overclocking crop, based on the new Yorkfield architecture. Truly, Lord of the CPUs. Reviewed in *Issue 83 – Page 53*	 **EVGA nForce 680i** PRICE $435 Stupidly over-featured and fast, if you've got the cash, then plonk it down here. Reviewed in *Issue 72 – Page 47*	 **Corsair Dominator Twin2X 10,000** PRICE $1016 Crazy speed sticks that will also happily do 1T/800MHz/3-3-3-3. Comes with a fan attachment to keep things cool! Reviewed in *Issue 77 – Page 58*	 **XFX GeForce 8800GTX Ultra XXX Edition SLI** PRICE $1126x2 This is far and away the most powerful graphics card on the market, but be willing to sacrifice your entire retirement fund for the privilege of having one of these tearing up your screen. Reviewed in *Issue 78 – Page 59*
	AMD			
	AMD Athlon 64 FX-62 PRICE $1072 Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile. Reviewed in *Issue 66 – Page 39*	 NEW ENTRY **ASUS M3A32-MVP Deluxe** PRICE $317 True perfection in a mobo form. Very well laid out and overclockable to boot. Reviewed in *Issue 85 – Page 51*		

www.nintek.com.au
AUSTRALIA'S LEADING COMPUTER RETAILER

'Bringing Atomic the hottest brands & low prices'

nintek
AUSTRALIA'S LEADING COMPUTER RETAILER

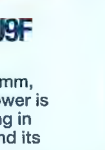
Coolers



Noctua NH-U9F
PRICE $80

It may only be 90mm, but its cooling power is exemplary, coming in only slightly behind its 120mm brother.

Reviewed in *Issue 72 – Page 42*



Thermalright Ultra 120
PRICE $75

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling.

Reviewed in *Issue 72 – Page 42*



Thermalright Ultra 120
PRICE $85

Make sure you get the optional AM2 bracket (hence the higher price). Grab that same Nexus fan.

Reviewed in *Issue 72 – Page 42*



Asetek Vapochill Lightspeed
PRICE $1020

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (pun!)

Reviewed in *Issue 64 – Page 38*



Cool-Trek Vostok
PRICE $199

Until more extreme cooling systems come along that are AM2 compatible, this little kit will have to fill the gap. Make sure you get the updated mounting kit.

Reviewed in *Issue 68 – Page 41*

System drives



Samsung HD160JJ 160GB
PRICE $68

Super quiet and yet still fast, the 160GB Samsung offers excellent value for money.

Reviewed in *Issue 69 – Page 40*



Seagate Barracuda 7200.10 320GB
PRICE $95

Seagate's fancy new technology makes this beast both fat and fast. Mmm, toasty.

Reviewed in *Issue 69 – Page 40*



Western Digital Raptor WD1500ADFD
PRICE $264x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

Reviewed in *Issue 62 – Page 40*

Displays



Samsung 931C
PRICE $323

2ms of raging colour gamuts and beautifully smooth tonality that will make you weep with joy and hug strangers.

Reviewed in *Issue 70 – Page 56*



Samsung 244T
PRICE $999

Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker.

Reviewed in *Issue 69 – Page 48*



Hewlett Packard LP3065
PRICE $2109

Thirty inches, 2560 x 1600, 8ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed.

Reviewed in *Issue 76 – Page 53*

Speakers



Steelsound 5Hv2
PRICE $120

Awesome gaming audio performance on a shoestring budget. Phenomenal 'phones.

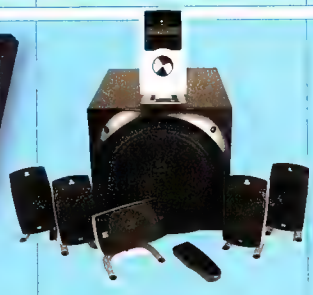
Reviewed in *Issue 73 – Page 43*



AVLabs AVL325
PRICE $165

While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1.

Reviewed in *Issue 64 – Page 50*

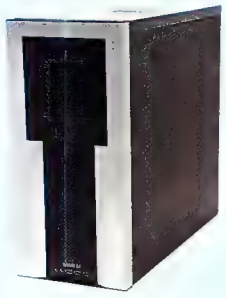


Logitech Z-5500D
PRICE $363

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in *Issue 48 – Page 56*

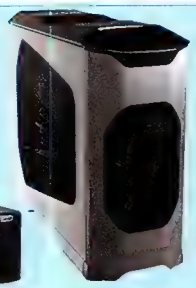
Cases



Lian Li PC-7S
PRICE $125

Quality, elegance, refinement and style. The trademarks of a Lian Li case, now available at an entry-level price.

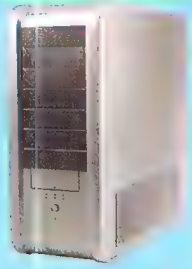
Reviewed in *Issue 79 – Page 46*



Cooler Master Stacker 830
PRICE $285

Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in *Issue 61 – Page 36*



Silverstone TJ07
PRICE $348

The Silverstone Temjin TJ07 is a huge hulking beast that shows you mean business in the finest style. Impeccable finish and plenty of room means win.

Reviewed in *Issue 65 – Page 49*

THE CHIPPERY

Silicon wars and opinion from the electron trenches.



It's clobberin' time!

Josh Collins has been muttering for days... we blame Ashton for the rage

With the release of 3-way SLI and CrossFire X technologies from NVIDIA and AMD ATI respectively, I couldn't help but wonder: who out there in the enthusiast market can actually utilise and afford these technologies?

Now, to get one thing clear straight away; I love technology, technology advancements and in general pushing the boundaries of where technological concepts and platforms can go in the future; but for crying out loud, there needs to be boundaries! I've bitched, I've moaned and I've outright complained about the fact that we get a new chipset every two to three months with generally miniscule changes over the last one, and that we get our hip pockets abused for all of our good hard-earned money; but it was not without reason. So, we have these onslaughts and waves of new technologies, some good, some bad and some so abysmal it becomes folklore as how something could so easily and effectively resemble a pile or steaming fecal matter.

> "So we have these waves of technologies, some good, some bad, and some so abysmal it becomes something like folklore."

This month, I'd like to pay tribute to all that has been crap-tastic and the technologies, products and concepts that should have been stopped around the time of the initial brain fart – swiftly followed by a four-by-two to the temple. With the technology industry the way it is, every Bill, Steve and Linus can get corporate support for a tech idea so long as they can spin a good story and promise millions in profit to the investors, just 'cause it's technology. We have ourselves a beautiful melting pot for crap concepts to become a reality. Not only that, but these people are then employed by international corporations, most notably the likes of Sony, which means they can then continue to release pathetic products and then blame the consumer public for just not seeing their inspirational and 'next-gen' view points.

The big S, Sony, has been mentioned but what are its failures you ask? Well for starters, after having such epically awesome consoles in the form of the original PlayStation and followed up with the PlayStation2, it appears that for Sony, third time is not a charm. Not only has the PlayStation3 seen poor sales it has also born the brunt of poor developer backing and as such there is still yet to be a game that the large majority of gamers would go "Hell yeah, I'd buy that console just for that game!". Add to this Sony's other tech children that are best left forgotten in the form of the Sony rootkits, Sony UMD and Sony Midi-Disc. Oh, but let's not forget the eleventy-billion types of Sony memory sticks – "Hey we can't get it right but we'll just keep on trying" – thanks guys.

Sony isn't the only company starting with S that has had some products that tanked in ways that make the Hindenburg to appear a golden high flying success. The console god of years' gone by, Sega, bowed out after great success with the Master System and Mega Drive in the late 80s and early 90s, lost in the hole of despair created by the Saturn and Dreamcast.

Also on the list of classic failures or tech that just came way before its time includes things such as the Apple Newton, pets.com, the 802.11a standard, the BTX form factor, Dvorak keyboards, Virtual Reality, Speech Recognition, Sapphire's X1950 Pro Dual, NVIDIA's GeForce 5 series graphics cards and Microsoft Windows ME.

In the coming months we'll see extravagant technologies continue to hit the scene or, already having hit, start to leave their mark – this mark could be a small skid-mark or a big ol' splat. Perhaps the most dramatic of these new technologies will include AMD ATI's CrossFire X, NVIDIA's 3-way SLI, Intel's Skulltrail and AMD's Phenom FX. Will they sink or swim? We can only speculate then crack another beer, sit back and watch the show unfold.



Josh hates the sea, and everything in it!
jcollins@atomicmpc.com.au

DH Series

Home Theatre Chassis' for the Entertainment Enthusiast

Join the Home Entertainment Revolution



Thermaltake's new DH series desktop cases are designed to be complete digital home theatre systems. Each case boasts piano-mirror surface-finish with aluminium front panel design; high efficiency ventilation in the form of a 12cm silent fan at the front and dual 6cm fans at the rear; stylish gold-plated foot stands; tool-free design for easy installation; 1 x 5.25" external drive bay & 3 x 3.5" internal drive bays; 7 expansion slots and compatibility with Windows Vista, MCE remote & keyboard. Moreover, the DH101 case boasts an in-built Media Lab LCD with hot keys module whilst the DH102 premium case features an in-built dual-monitor display and 7" touch-screen functional control with 10 hot key buttons.
So what are you waiting for? Become part of the digital age!

Thermaltake
COOLall YOUR LIFE

www.thermaltake.com.au

GROUNDZERO

Dan talks tech like you've never heard before



The benign botnet

It's about healing the world's ills, says **Dan Rutter.** Time to get hacking for health.

At first, botnets – centrally-controlled collections of Internet-connected virus-infected 'zombie' PCs – didn't do anything very imaginative.

The bot-herders used, and still use, their countless slaves to send spam. A botnet can also swamp other people's systems with traffic – a 'distributed denial of service' attack.

One other profitable but uncreative technique is to install whatever pieces of slime-dripping adware make the bot-herders the most money on every zombie PC. Or the botnet can just fake clicks on ads that the owners of the infected PCs never actually even saw.

Until recently, that was about all botnets did.

Now, though, botnets are not just sending you spam, but actually hosting the sites they're spamming about. In this 'botnet hosting', the zombie that hosts the site changes from minute to minute, and the nameservers that tell your browser where the host-zombie is are, themselves, zombies.

If you can overlook the minor detail that it's all stolen property, these botnets are the best value distributed hosting solution ever created. And, every time a new wave of malware sweeps across the Net, someone new comes up with the brilliant idea of a 'white-hat' version of the same thing.

It seems like a reasonable idea on the face of it. Make your own worm, that takes advantage of the same weaknesses as the real malware – or perhaps just sits there waiting to be probed by some other worm, then lashes out. When the white-hat worm infects a new PC, it plugs the very hole it came in through, installs a bunch of other security patches, and then plays a brief patriotic song.

There are two fatal problems with the white-hat virus idea.

One: Distributing a 'friendly' virus breaks the same laws as distributing any other virus. 'Breaking and decorating' – breaking into someone's house with the intention of tidying it up and improving the furniture – is still breaking into someone's house.

Two: Curing a modern malware infestation can be close to impossible even if you're a knowledgeable user. There's already a pretty serious arms race running between the makers of the various evil botnets, and those guys have serious money to pay programmers. Good luck beating them with your SourceForge project.

> "... these botnets are the best value distributed hosting solution ever created."

So I have a modest proposal: Benign botnets.

There are lots of very worthy distributed computing projects out there. Everybody knows about SETI@Home and Folding@Home, but there are tons of others. Climate prediction, drug modelling, cancer tissue microarray analysis – the list goes on and on.

Distributed computing projects don't pay participants, so botnet operators don't care about them. But distributed projects are ideal candidates to be sneakily, and anonymously, installed behind unknowing users' backs.

Distributed computing apps are also 'slopsuckers' – they run at the lowest possible priority, so any other task gets CPU time before they do. This means their impact on the performance of a PC is barely measurable, even if the PC isn't the kind of spyware cesspit that usually participates in a botnet.

There's other software that could be installed in the same way. Free anonymous data networks like Tor and Freenet haven't really taken off, because participation is entirely voluntary. Sneak Freenet and Tor nodes with small disk space and bandwidth quotas onto a million unpatched Windows boxes, though, and the Great Firewall of China would never know what hit it.

A benign botnet would still be illegal, and it would still definitely qualify as theft of resources. If nothing else, it'd be stealing electricity, by pegging CPU utilisation at 100 per cent.

But a benign botnet really could work. It wouldn't have to try to attack the impossible task of automatically cleaning away other infections; it could just quietly install itself next to them, and consume no resources that the other infections cared about.

It wouldn't so much be breaking and decorating. More like breaking and setting up a small medical research lab in the attic.



Got some lab space you'd like to share with Dan?
dan@atomicmpc.com.au

Introducing

THE QUAD CORE GAMING BEAST



Quality Assured

Our technicians are constantly adopting the latest technology in our pursuit for gaming performance. Our featured product this month is an overclocked gaming system based around the Intel Q6600 Quad Core CPU, Abit ip35pro motherboard and Chaintech Apogee 1066Mhz Memory. With three soon to be released gaming engines all sporting multithread support, quad core CPUs are set to take over the performance crown in the gaming arena.

Specifications

- Intel Q6600 2.4GHz Quad Core
- Thermalright Ultra 120 eXtreme
- Antec 120mm Tri Cool
- Abit IP-35 Pro Motherboard
- 2GB Apogee DDR1066MHz Memory
- 8800GTX 768MB DDR3 PCI-E Graphics Card
- 500GB WD SATA-2 HDD
- 18x Pioneer SATA DVD+-RW
- Grill Front High Flow Window Tower
- Ultrix 600Watt True Power Supply
- Windows XP Home Edition
- Assembly & OS Installation
- Tested to DCA's Exacting Standards
- Return to Base Warranty 1-3 Years

- 24HR STRESS TEST BURN IN
- MANAGED CABLING
- EACH PC COMES WITH TEST CERTIFICATION
- ROCK SOLID STABILITY



OVER CLOCKED TO 3.2Ghz

CRYSIS? NO CRISIS!
Unleash the Beast!



Graphics

- Geforce 8800GTX 768Mb DDR3 PCI-e VGA
- Bang for Buck High End Gaming Graphics
- Crank up the eye candy and watch the frames fly!



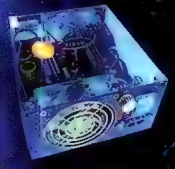
Memory

- Chaintech Apogee 1066Mhz DDR-2 memory modules
- Peak data transfer rate of 8500MB/s
- 60% faster than standard DDR-2 667Mhz memory modules



Heatsink

- Thermalright Ultra 120 Extreme Heatpipe cooler
- Comprehensively tested by DCA technicians
- "Outperforms any other heatpipe air cooler that we have examined"



PSU

- Ultrix Extreme Power 600W PSU
- Blue LED fans
- Variable speed fan controller
- Separate 12V Rails to Motherboard and Drives
- Our most reliable high end PSU – 3 yr warranty!

$2379
Add $120 for 3yrs United Electrical National On-site Warranty

DCA Computers

Shop 3, Castle Hill Homemaker Centre 6 Victoria Ave, Cnr Gladstone Rd, Castle Hill NSW 2154
Phone: 02 9634 2555 Fax: 02 9634 8319 Email: sales@dcacomputers.com.au

www.dcacomputers.com.au

EXCELLENCE IN COMPUTER ENGINEERING (Since 1993)



Subscribe online @ www.atomicmpc.co

SUBSCRIBE AND SCORE A DVD!

To celebrate the release of *Babylon 5: The Lost Tales* on DVD, us sci-fi geeks at Atomic partnered up with Warner Home Video to give away $10,000 worth of free DVDs... the first 25 new subscribers this month will score a copy of the film *Babylon 5: The Lost Tales* on DVD. All other new subscribers will receive an entire season of the original Babylon 5 TV series.
Everybody scores sci-fi goodness!

WHY SUBSCRIBE?

1. SAVE SOME HARD EARNED DOLLARS
2. SCORE A BABYLON 5 DVD
3. DELIVERED TO YOUR DOOR, OR MAILBOX, OR SECRET HIDEAWAY
4. FULL MONEY BACK GUARANTEE
5. THE GREATEST TECH MAG IN THE GALAXY

SUBSCRIPTION PRICES

Australia

1 YEAR (12 issues) – $69.95 **SAVE 35%** off the newsstand price

2 YEAR (24 issues) – $120.00 **SAVE 44%** off the newsstand price

NZ

1 YEAR (12 issues) – NZ$75.95 **SAVE 30%** off the newsstand price

2 YEAR (24 issues) – NZ$137.00 **SAVE 40%** off the newsstand price

Offer available until 12/2/07. See website for terms and conditions. Page Code: CI/A85

m.au/subscribe or call (02) 8227 6499

AUSTRALIAN

FourFourTwo

THE ULTIMATE FOOTBALL WEBSITE



HAVE YOU LOGGED ON TO AUSTRALIA'S FASTEST GROWING FOOTBALL SITE YET?

au.fourfourtwo.com

ALL THE ACTION AS IT HAPPENS...

AU.FOURFOURTWO.COM





GAMEPLAY

GAMES, GAMING AND GAMERS COVERED ATOMIC-STYLE

We get a little bit more in depth with our games this month, thanks to the inevitable post end of year slow down of big-huge releases. But that doesn't mean we're getting lazy.

Speaking of big releases, though, we finally have *Mass Effect*, a tectonically huge RPG from the masters of the genre, BioWare. We finally get a chance to look at *Empire Earth III* as well, and see if the game continues to deliver a fun RTS challenge.

This month also sees Logan Booker strap on his gun and sword and get to the low down on the upcoming cross-platform *Devil May Cry 4*, while Alex Gambotto-Burke takes a long hard look at the state of the modern RPG in the first of a semi-regular series that finds out what's keeping the old genres ticking.









GAMEPLAY CONTENTS

Engine Room:

Devil May Cry 4 68
What's Dante got up his sleeve for this latest instalment of the guns and swords classic?

State of the RPG 72
The RPG has been, apparently, dying a slow death for years. Really? We've got three reasons to think otherwise.

Game Reviews

Mass Effect 76
Empire Earth III 78
Pro Evolution Soccer 2008 79

Culture Shock

Cashback 81
Rescue Dawn 81
Bladerunner: The Final Cut 81



Win one of five BlackSite prize packs!

BlackSite is the great new FPS from Midway and Red Ant, and places you in command of a squad of elite soldiers in the middle of an alien incursion in modern day America. Each prize pack includes a copy of the game, and super cool BlackSite t-shirt.

To win, you know what to do – point your browser at
www.atomicmpc.com.au/competitions



Boys Don't Cry

Logan Booker exchanges sword blows and gunfire with *Devil May Cry 4* producer Hiroyuki Kobayashi.

The very first Devil May Cry was never meant to be Devil May Cry. Not originally. When Capcom started production on the title, it was intended as a sequel to Resident Evil 2. As development progressed, however, it became clear that the sequel brought more to the table – more than what the survival horror genre could contain.

With its unique look and heavy action focus, the game that was to be just another notch in the *RE* belt became an entity unto itself. Capcom made the decision to split it from the zombie mother ship and out of the project came *Devil May Cry*.



You can just tell what she's thinking... "Dance, dance, dance... kill. Dance, kill, dance, dance. Pout."

Players the world over were introduced to the complex character of Dante, a mercenary and demon hunter, himself the spawn of the hellish creature known as Sparda. Dante, with his trademark dual pistols, blades and innate special abilities, had little trouble making a mark.

The game proved successful enough to justify a sequel, which also did well. Capcom saw reason enough to commission a third title and now, off the back of its greatness, the publisher/developer is working on a fourth instalment. Confident, perhaps, that the fans aren't going anywhere, Capcom plans to concoct a new ingredient to add to the game's formula for *Devil May Cry 4*.

Two's better than one

The most important change for *Devil May Cry 4* is that of the producer. Returning from his success on *Resident Evil 4*, Hiroyuki Kobayashi is seated at the head of the table for the fourth game in the series.

It also helps, just a bit, that Kobayashi was the original producer of *Devil May Cry*.

As we expected, Kobayashi was more interested in chatting about the aspects of the new title than his previous conquests. Thankfully the question of "What's new?" was the first on our minds.

"In *DMC4* we are introducing Nero, a brand new character to the series who is a knight in the Order of the Sword, a religious order that is based in the coastal town of Fortuna and worships the legendary Sparda," explains Kobayashi. "When Dante bursts in on an important ceremony and kills the High Priest and other members of the Order, Nero fears for the safety of his childhood friend Kyrie and attacks Dante."

It is at this point that demons begin invading the town of Fortuna; the creatures take little time to slaughter Fortuna's occupants. While the reason for the invasion isn't revealed at this stage of the game, Kobayashi assures us that the story will explain itself as the player progresses through the game.

"Other characters in the game include Trish & Lady, who fans of the series will know well, plus a whole host of brand new enemies and bosses for Nero and Dante to fight." Nero [i]and[/i] Dante? Does that mean the player won't be playing





Over the top bosses that melt the earth with their very tread? Yeah, Dante should look worried.

the series' titular character?

The answer to that question is yes. Kobayashi says that Nero, not Dante, will be the game's main protagonist. While he shares a striking resemblance to the Dante we know, Nero brings with him a new arsenal of weapons for the player to destroy their foes with.

"Although he fights with a sword and gun like Dante, Nero also has the Devil Bringer arm, which has allowed us to introduce some exciting new gameplay features," says Kobayashi. "For example, Nero can grab enemies while on the ground or even in the air and pull them towards him, which will allow players to extend the length of combos and perform some devastating attacks."

The Devil Bringer also serves as a puzzle-solving tool, giving the player the ability to snag hard-to-reach items, and, by using the arm to swing around, leap over obstacles or great distances. No doubt it will be vital for new and old players alike to approach new areas and situations with this cool sounding capability in mind.

Power to the console

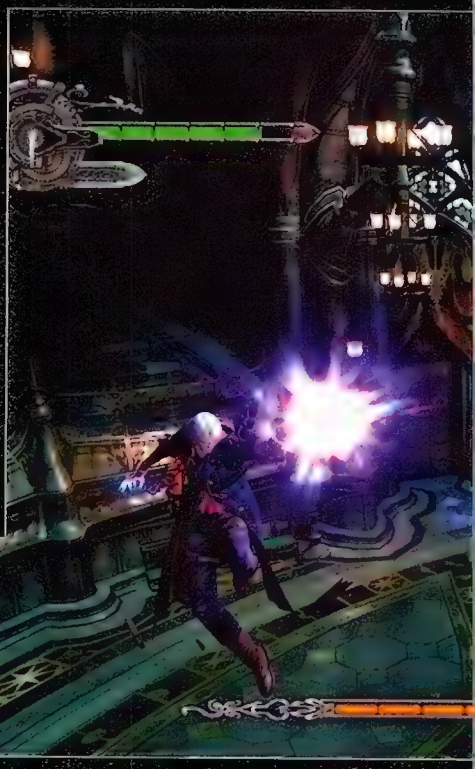
Devil May Cry 4 will be released on Xbox 360 and Playstation 3 to start with, while a PC version is planned for later. When the game was announced, Capcom declared the title would be a PS3 exclusive.

Then, not long after this announcement, Capcom decided to do a complete 360 (no pun intended) and dropped the PS3 exclusivity. When we asked Kobayashi why this was done, he had this to say:

"We simply wanted to offer as many gamers as possible the opportunity to play the game. The impact to the development schedule was minimised thanks to the proprietary cross platform development tools Capcom has created." If it hasn't hurt development of the game, we don't see any negatives to







Nero, the new hero... anti-hero? The new *character* on the DMC scene.

a multi-platform release. In fact, the only company that might have been upset by the news is Sony.

According to Kobayashi, *Devil May Cry 4* will offer larger environments to battle in over those of previous games. The producer puts this change down to the availability of next-gen hardware. Specifically, he says that the new consoles provide ample resources to expand the game world, in terms of disc and memory space.

"A lot of the action [in previous *DMC* games] took place in enclosed areas. But now, free from such memory constraints, we can create much more expansive and open areas that give the feeling of a real world, rather than a series of rooms." This is good news – no one wants to play a totally linear game if they can help it.

The power provided by the Xbox 360's three cores and the PS3's seven (if you count the PowerPC core), has given Kobayashi the ability to enhance gameplay itself. While it's easy to get focused on what the next generation can deliver visually, the producer readily explained to us how the hardware can improve any aspect of a game. For *Devil May Cry 4*, this is particularly true.

"I've already touched on one thing – the size and scope of the environments – but other things include the fluid animation and the ability to change styles on the fly," he says. "Fluid, non-stop action has always been important in previous *DMC* games and in *DMC 4* our aim was to achieve a steady 60 frames per second, regardless of what was happening on screen. I am really pleased to say the team has achieved this goal, which sets the title apart from the majority of action games currently on the market."

A constant 60fps on both the 360 and PS3? Definitely possible given the closed nature of the hardware, but we're not so sure this will be achievable elsewhere given the varied





configurations of the PC world.

Comparing *DMC 4* to its predecessors, Kobayashi says that in *DMC 3*, the player had to stop the game to select between Dante's various styles. With *DMC 4*, the team has been able to make this possible in real-time, something the producer feels will help keep the action moving.

Of course, the land of next-gen development isn't without its shortfalls.

"We were forced to sacrifice a few of the extra graphical effects that we wanted to put into the game," says Kobayashi. His reasoning is the limited space of the Xbox 360's DVD format, and the PS3's deficiency in the RAM department. Speaking generally on space and size restrictions, the producer says that cutting content from a title needs to be handled on a case-by-case basis.

"If you have to reduce or cut features, you need to look at what is low-priority for your title based on the initial design document so I can't really say which specific items or features would be cut."

Speaking specifically on each platform, Kobayashi says he's been happy with the development environments of both the Xbox 360 and Playstation 3. He didn't comment on the PC, but we're sure it'll become a talking point next year when the inevitable comparisons are made. The producer does however credit Capcom's excellent cross-platform development tools, which have allowed Kobayashi to focus on the game proper, rather than the making of it.

"My personal opinion is that we have created a game that looks stunning and more importantly plays great on both platforms," he says.

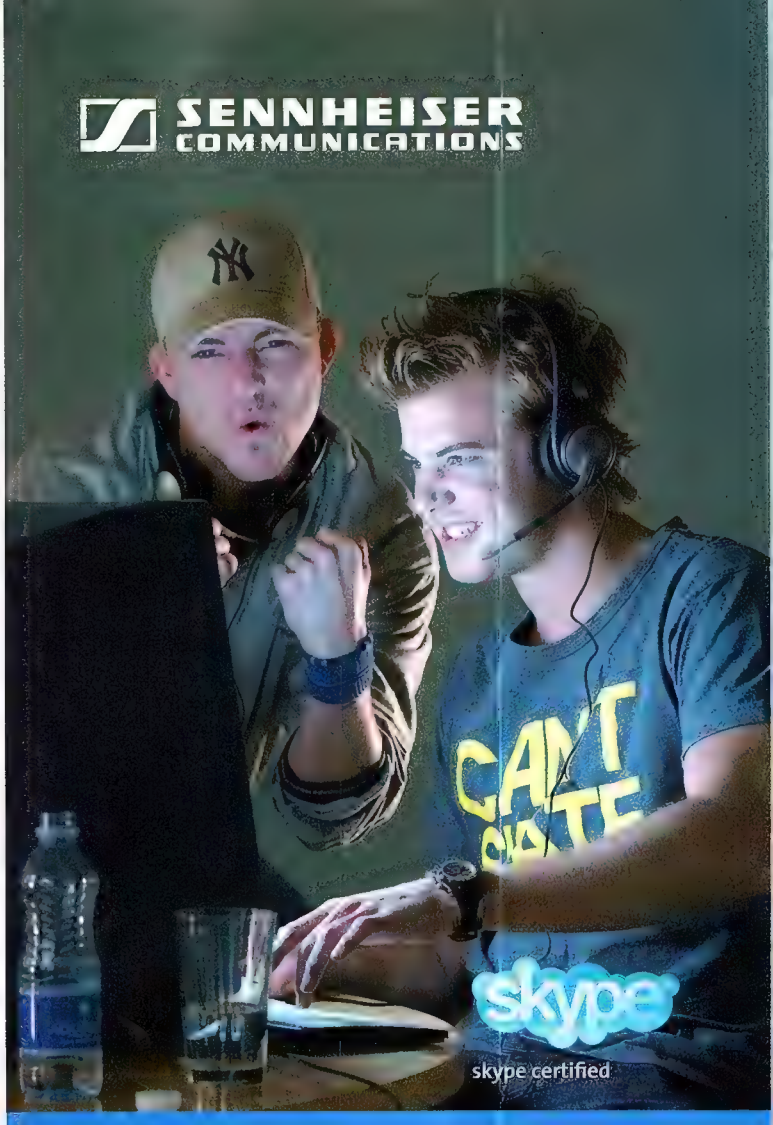
Teary goodbye

When we asked Kobayashi which feature or features of the game will impress gamers the most, he provided us with the characters and action focus of *Devil May Cry 4*.

"I really think the cool, stylish action that we have in this game will be really well received," he says. "I also think that the many charming, cool and sexy characters that we have created are going to be a real hit!"

If you own an Xbox 360 or Playstation 3, then you'll only have to wait until early 2008 to get your hands on *Devil May Cry 4*. As for the PC, well, you'll just have to wait until Activision is comfortable enough to give a release date.

That, or buy yourself a console...



No advantage is

The best players rely on Sennheiser. Thanks to the ultra-comfortable headband, hour long game playing and internet surfing on your PC will become a totally new and exciting experience. Its noise cancelling microphone, inline volume-control and the microphone mute function is sure to give you an added advantage. Sounds rough for the competition, right?

For your nearest authorised dealer
Australia Free Call 1800 648 628 Email: sales@syntec.com.au
New Zealand Call 09 263 9885 Email: sales@syntec.co.nz

www.sennheisercommunications.com.au

State of the RPG



In the first of an ongoing series, Alex Gambotto-Burke looks at the modern RPG in all its fake dice rolling glory.

With *Oblivion*, Bethesda Softworks had created, at least according to the PR copy available at the time, the "RPG for the Next Generation". And, sure enough, it was a bit of a stunner, even if the winds of time have seemingly judged its story and gameplay to be a little on the anemic side. But even before its lustre started to wear, there was concern among RPG lovers: would the *Oblivion* formula (freedom of movement, rather than freedom of story) prove dominant? And if so, what would happen to the *Ultimas*, *Fallouts*, and *Baldur's Gates* of the world? The age of the epic story RPG, it seemed, was finally sputtering to a complete halt. Heck, even the dumb-but-delectable action-RPG looked ready to give in, especially with no *Diablo* sequel in sight.

Two years later, though, and things are looking very different. Obsidian Entertainment's *Neverwinter Nights 2* hit shelves in late '06, and received "generally favorable reviews" according to Metacritic – enthusiastic pluses were mostly directed at the renewed, successful focus on story; grumpy minuses tended to prod at the game's not-insignificant bugs and performance issues. Despairingly, though, it was commented on by many reviewers as being the final, stubbornly triumphant nail in the old-school RPG's coffin.

So much melodramatic tripe that turned out to be. Obsidian has just released the first in what this writer hopes to be a reasonably comprehensive series of expansion packs, *Mask of the Betrayer*. This is great news for two reasons: first, it finally proves that the California-based studio is actually capable of releasing a quality product without it crumbling into little pieces of BSOD due to rushed coding (why are RPGs and bugs such tender bedfellows, anyway?). Secondly, and much more importantly, *Mask of the Betrayer* is evidence that interesting, well-plotted RPGs with plenty of opportunities for free choice are in no way on the out.

If you're unfamiliar with *NWN2*, here's the spiel: it's the sequel to BioWare's massively successful 2002 RPG creation, *Neverwinter Nights*. *NWN* was BioWare's first foray into role-playing in the third dimension, and it paid off immensely – the robust-but-accessible toolset it included with the game allowed even novice gamers to create serviceable little RPG experiences. Where it fell down was in the single-player campaign, which was vanilla enough for quite a few gamers to accuse it of being totally perfunctory; a comprehensive demonstration of the *NWN* toolset's capabilities more than anything else.

This wasn't entirely fair – but then, RPG gamers aren't renowned for their prudence. *NWN's* storyline





wasn't bad at all; it just wasn't really up to the standard BioWare set with the *Baldur's Gate* series and continued with the likes of *NWN: Hordes of the Underdark* and *Jade Empire*. For this reason alone, the onus was on Obsidian to give the sequel the single-player campaign the original deserved.

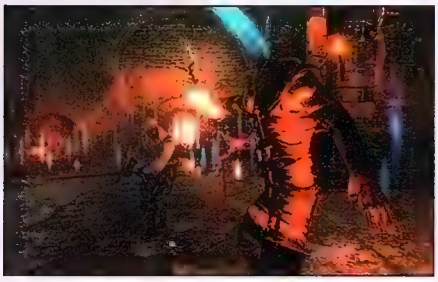
Ding – level up!

And in this, most can agree that they succeeded. *NWN2's* story was full of the kind of intrigue, drama, and humour we've come to expect from top-shelf D&D games, and with the sexy visuals the reworked BioWare Aurora Engine (re-dubbed the Electron Engine) provided, it was difficult to dismiss the "definitive D&D game" promise spouted by ye olde PR folks. A revolution for the genre? Hardly; it's no *Planescape: Torment* (which is funny, given that many of the chaps at Obsidian worked on *PS:T*). But it's a definite sign that the style of role-playing *NWN* provides still has a future.

Mask of the Betrayer takes the focus on story even further, doing the usual RPG expansion/sequel trick of sticking to the formula, but covering everything in a layer of freakishness that would get Hieronymus Bosch prickly with envy. As such, your cast of companions from the original campaign – nature-lovin' elf chick, ball-of-testosterone dwarf, stoic knight, etc – have been ditched in favour of such lovelies as an ambivalent angel, a son-of-a-hag (seriously) who walks in people's dreams, and a giant, garishly-coloured bear god. Can anyone say "I think I'm turning Japanese I think I'm turning Japanese I really think so"?

Beyond weirding up your pals, Obsidian's also showing its desperation to escape the confines of D&D by introducing an entirely new gameplay mechanic, which I can't really tell you about, as it's a bit of a spoiler. Suffice to say, though, your character hungers for something, and must find a morally tenable/outright dastardly way to acquire it. It's not blood, by the way, as everyone knows vampires curse developers into bankruptcy (just ask Troika). It'll provide you with a range of new abilities, and it introduces a new morality measurement that's infinitely more sensible than D&D's stiff alignment system. Basically, the more you use your more aggressive powers, the closer you'll come to becoming a monster – a monster with some awesome bonus spells, granted, but a monster nevertheless. It's a welcome addition to the otherwise trad-fantasy formula *NWN2* provides, and proves that if you've got a few talented





developers, it's not impossible to keep the D&D experience fresh.

Which witch?

That said, if you're after genre reinvention, it might be an idea to forego the beaten dungeon track altogether, and do something completely crazy. Like, say, base your non-linear, heavily story-driven RPG on a bunch of books by a Polish dude you've probably never heard of – Andrzej Sapkowski, by the way, and the series is *The Witcher*. Conglomerated into a single interactive volume, *The Witcher* as envisioned by developer CD Projekt, is a formidable beast. At first glance, hackneyed, atrocious phrases like "dripping with atmosphere" will enter your brain with abandon (or even acknowledgement that as atmosphere is by nature gaseous, it cannot drip). In stretching itself away from a classic high-fantasy setting with green grass and red dragons, CD Projekt has forced its artists to work hard. The result – a bleak, crumbling, decadent medieval landscape never rendered before with such skill – is arresting.

Sure, there are prettier visuals out there, but so few games combine them with a talented art staff, immersive ambient noise, and convincing AI routines. *The Witcher* even boasts the kind of procedural NPC conversations you saw in *Oblivion*, but because the environments are so busy, you don't really notice awkward or repeated dialogue.

It's a marvellous step forward for the genre; other story-focused RPGs – *Neverwinter Nights 2*, for instance – depict urban environments in an almost still-life manner. In *The Witcher*, places come alive – addled with plague, granted, but you can't have everything.

This is especially surprising, given that *The Witcher* actually runs on a mucho-tweaked version of the Aurora Engine. You'll never, ever guess it, though, especially when you set the camera right down where this game is meant to be played – over the shoulder. And unlike in *Neverwinter Nights 2*, the OTS camera actually works; there's an incredibly tactile feel to it. You'll be surprised you're not playing an action game with this baby.

In fact, the perfect OTS camera isn't the only evidence that CD Projekt wanted to take *The Witcher* into twitchier territory – the combat system seems a little like a compromise between die rolls and hack 'n' slash. Essentially, you've got to shift between the right weapon for the right situation – steel sword for humans, silver sword for monsters – and then you need to pick your style. The three styles differ greatly in their execution and effectiveness against certain targets, but choosing the right combat dance will quickly become instinct. So far, so turn-based, right? It's a little more complicated – once the game decides you've found an opening, Geralt (that's you) will make his move. At some point during his swordplay, your cursor will immolate itself, and if you're quicky with the clicky, you'll get Geralt to perform a combo. These can be strung together into quite impressive, motion-captured swordfights.

It's difficult to tell whether this sort of RPG combat – which, I might add, is of course augmented by your standard skill and ability upgrades – will prove popular in the genre. There's no denying, though, that it's a venerable stab at moving away from the turn-based scuffles you'll see in every D&D adaptation (and there are many) around. It strikes a satisfying balance – on the one hand, your character's fighting ability is dictated by what skills he has; on the other, you're still given an opportunity for active input.

The most impressive part of *The Witcher*,

however, is its story. It's a fairly epic affair, with all the standard narrative choke-points you've come to expect over the years (or decades, if you're really old), but where CD Projekt's title distinguishes itself is in the amount of meaningful, purposeful freedom you're given in the interim. Almost every quest and dialogue option gives you the opportunity to make choices which may seem insignificant at the time, but will prove hugely influential later on. (Quite often, just so the game can let you know how clever it is, you'll snap to a cutscene where Geralt will examine the events unfolding before him, and how they were affected by the choices you made earlier.) It's a very logical and believable approach to interactive storytelling, and you'll appreciate it that much more when you return to other RPGs, whose story-changing choices are often outlined in "SAVING THIS ELF WILL GIVE YOU THIS UNIQUE SWORD, BUT THE CAPTOR'S FACTION WILL BECOME HOSTILE. ARE YOU OKAY WITH THAT, CHIEF?" red text. It's a far more subtle affair.

Or, it would be, were the game not let down by its crass sex-card gimmick. Undoubtedly a further example of freedom-of-choice – you can sleep with whoever you want in this game! Rad? Not really; the sex component of the gameplay plays out more like a porn film directed by Shane Warne than a meaningful sexual encounter in a narrative. Basically, with almost every chatty female NPC in the entire game, you'll find a way to convince them to take their pants off – officially so your character can have sex with them, but really so you can collect a cheesy snapshot of their boobies. It's tremendously asinine, and severely compromises the credibility and believability of the female characters in the game. I mean, Geralt's not even that good-looking. And he smells of dead monster. What's to like?

Click... click-click. Click.

Where *The Witcher* is hurt by its occasional streak of brainlessness – which, ultimately, was probably just a way to attract the Great Horny Horde, who wouldn't have otherwise bought an RPG by an obscure Polish developer – another pseudo-RPG doing the rounds considers it ambrosia. Flagship Studios' *Hellgate: London* doesn't feature any boobies (to my knowledge), but it does offer the kind of ecstatically monotonous gameplay that wouldn't strain you too much even after a complete frontal lobotomy. Furious mouse-hammering is the order of the day as you traipse around a randomly-generated faux-London, slashing and blasting and exploding the very ugly minions of hell back whence they arrived. And as the game progresses, you'll find yourself willingly hopping onto the Pavlovian treadmill of "explore, slash, burn, collect progressively shinier loot, return home". You'll no longer care that the game's orgy of holy bloodshed has eased you into a hypnotic state not unlike what those Japanese kids experienced when they watched that killer Pokemon episode.

Is this a step forward for the genre? Not at all – *Diablo* did it 11 years ago. and *Diablo II* did it even better seven years ago. And up against *Hellgate*, *Diablo II* is still the superior game, but that's largely due to the clever art/story team at Blizzard, who dressed up the simple, effective gameplay in an unforgettable setting. *Hellgate's* story and cutscenes are more prosaic, but the gameplay remains untarnished – plus, you get the *Diablo* experience in full-3D, which is something most hack 'n' slash fans have been waiting for since 2000. Don't get caught up in the gloom that proceeded *Hellgate's* ridiculous hype – this is a quality title for when your Thinking Cap needs a recharge.

Which, ultimately, is what the RPG genre needs at this point. Of the three titles mentioned here, only one seems totally dedicated to pushing genre paradigms, but it's heartening to see such competent titles released when things were looking pretty grim. RPGs are still the most effective game genre in which to tell interactive stories, so to let that key advantage go to waste in favor of large, sparse gameworlds would be a travesty. *Oblivion* Schmoblivion, in other words. No, that doesn't work. Can I have more space? (*No –ed*)







"Hey... wait a minute! The Normandy's bigger on the inside... than the outside! What's up with that?"

Mass Effect

Power armour? Check. Assault rifle? Oh yeah. Morally challenging storyline and epic plot? Absolutely.

BioWare is one of the biggest leading lights of computer RPG design – outside of Japan, at least. The company cemented its reputation with *Knights of the Old Republic*, the tale of the ancient war between Sith and Jedi, and before then it had made a name with the excellent *Baldur's Gate* and *Neverwinter Nights* D&D-based RPGs. *Jade Empire* continued the trend, and showed that BioWare could handle a ground up property as well as they could one based off of more traditional pen-and-paper games.

And now *Mass Effect* is here, arguably the most anticipated game that BioWare has ever developed. Has the wait – and the hype – been worth it?

It's a shame that that question is not an easy one to answer.

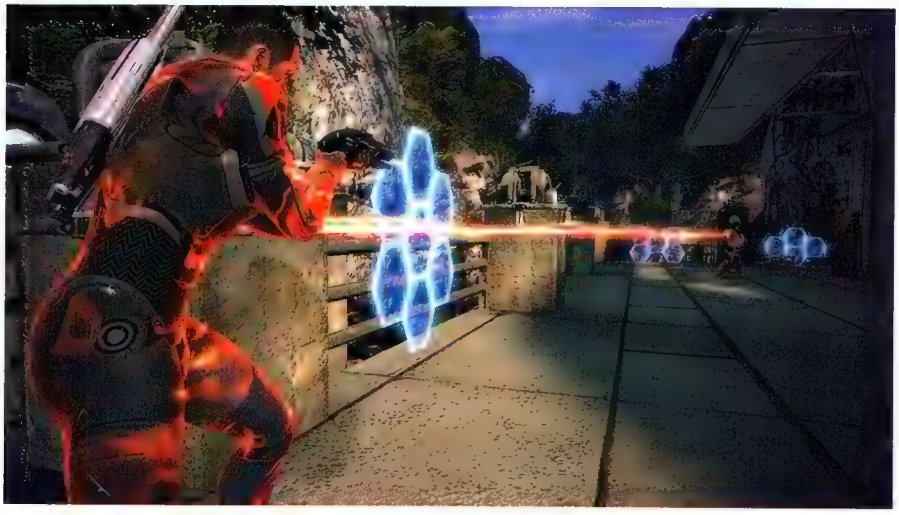
On the side of rampant fanboi-ism is the fact that *Mass Effect* is a game of incredible depth. Quite literally, you will not find a more well-constructed or well-presented universe outside of a multi-novel sci-fi epic. During our run through of the game we levelled up the main character on more than one occasion simply by discovering new details about the game world and its inhabitants.

On the side of the less-than-thrilled is the fact that many important game sub-systems – like inventory management, to name one huge lurking bugbear – seem ill-thought out or just plain rushed.

Everything starts swimmingly, however. The first thing you get to do is create your character – regardless of the gender you want to play, you're stuck with the last name of Shepard and a set number of background options to choose from. It seems limiting at first, but as the game progresses this becomes an excellent design choice. You can choose a first name of your own, and the actual physical characteristics you can play with are very complete – we had no trouble making our Commander Ulysses T Shepard look not unlike Captain Richard Winters in the *Band of Brothers* TV series.

The action starts pretty much right away – you command the marine detachment aboard a human frigate responding to a colony distress call, which, of course, is the prelude to matters of incredible galactic importance.

There's this ancient race, the Protheans, you see, who built all this marvellous technology millennia ago then politely buggered off somewhere. It's this hold-over tech that much of the modern galactic civilisation is built on, including the Mass Relays that fling starships all over the galaxy in the blink of an eye. It's not an incredibly fresh idea, but it is a time-tested classic.







Above are two ways of dealing with trouble – you can talk it over, have a coffee, maybe make sweet love; or you can shoot stuff. Bang!



The future might be bleak, full of danger and galaxy destroying lifeforms, but it sure is pretty.

But it appears they didn't go quietly into that long night, and that whatever happened to them might be about to happen to modern civilisation, and it's up to Shepard to stop it.

It's a simple tale on paper, but there are layers that unfold during the course of the game. Humans have only recently arrived on the galactic stage, for instance, and Shepard must prove himself, and humanity, worthy of inclusion in these grave matters before he can even get about saving the day. At the same time as Shepard is trying to impress his new bosses (and possibly piss off his old human ones), he's got to keep his ragtag collection of NPC crew happy as well.

All of this crew and NPC interaction is driven by hundreds of hours of scripted dialogue, and chosen from some of the most organic dialogue trees we've ever seen. Conversations flow, arguments can be riposted, and the voice-acting is almost all top notch. What's more, there's some real punch behind the decisions you make, and a conversation you cut short because you're pissed off might come back to haunt you.

As we said, the story-telling is top notch, and helping you make the right decisions is the incredible amount of background detail that you gather in your Codex (this game's equivalent of the ubiquitous RPG staple, the journal). Technology, history, people, places… every time you visit a planet, find new tech, and even in some conversations, you get new info on the *Mass Effect* universe. There's so much info to gather, and it's such interesting stuff, that some of our play sessions were little more than research and reading through the Codex.

But, also as we said, there are problems.

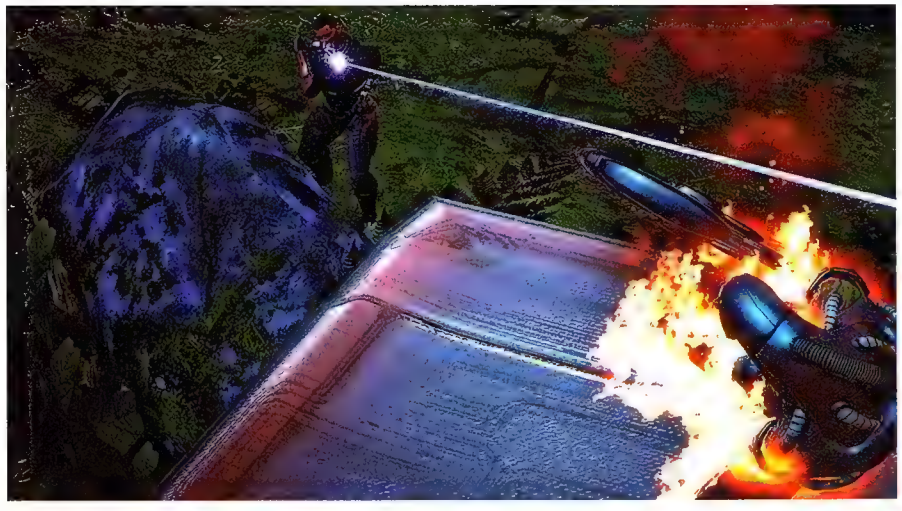
Say what you will about the D20-based system used in *KOTOR* and the *Forgotten Realms* games of BioWare's past, but at least it was a transparent and easy to understand system. The same cannot be said of the proprietary mechanics used in *Mass Effect*.

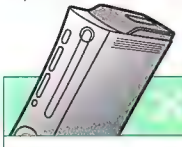
There's the usual spread of character types, from the tough Soldier to the game's spell-casting class, the Biotic, and all in between; however, the game itself is so combat heavy that any non-soldier class is immediately hamstrung.

As you level your character, you can put points into skills, which in turn unlocks special abilities. It seems simple, but some skills don't actually add anything active – rather, they boost things like healing rate and shield recharge across the party. Other skills, like Assault Rifle for instance, directly improve accuracy, but given that combat is essentially a third person action game, those skill increases are not always apparent.

Mass Effect uses the Unreal Engine 3 to drive its pretties, and the game does look great, but some action sequences, or particularly large areas, cause a staggering drop in frame rate. Combine this with an intrusive and mood-shattering series of near random load times, where the action freezes and a disc icon flashes on the screen (and don't get us started on how easy it is to mistake that message for the auto-save dialogue… grr!), and all the great work of the game's writers and voice actors can quickly come undone.

The problems with *Mass Effect* do not stop the game being a good, or even a great, experience. Any RPG fan should just go and buy it now. But they do stop it being a perfect one. BioWare's still one of the best in the field, but with smaller companies releasing great titles like *The Witcher* (reviewed issue 84), BioWare cannot rest on its laurels.





X80x360

Developer **BioWare**
Publisher **Microsoft Game Studios**
Website **http://masseffect.bioware.com/**

VERDICT

Matchless story-telling; incredibly realised game-world; superb voice acting

Poor AI; abysmal inventory system; low frame rates

SCORE **8.5** OUT OF **10**







A game so uninspiring that even our caption-writing monkey is bereft of words. True story.

Empire Earth III

Robbie Grant sets his sights on world domination.

The idea of turning *Civilization* into an RTS has been around for a while, and is an idea that has met with varying degrees of success. *Empire Earth* was a title that drew its fair share of praise when first released, with Rick Goodman drawing on his work on *Age of Empires* to create a game grander in scope and more detailed in its execution. Since then, development of the franchise has been taken over by Mad Doc (*Star Trek: Armada II*, *Jane's Attack Squadron*), who originally stayed close to the formula laid down in the first in the series.

Empire Earth III, then, became Mad Doc's opportunity to change the gameplay to suit its own vision, while still retaining the general feel and structure of the previous games. Tinkering with a good thing is always a dangerous proposition, but it's something that is undoubtedly necessary if a series is to avoid stagnation and repetition. But has Mad Doc made changes for the better, or for worse?

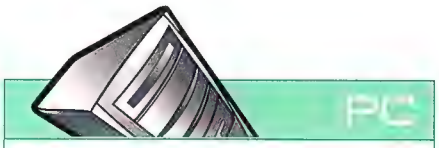
One of the most notable things about *EEIII* compared to previous games is the distinct lack of historical accuracy or detail. Where previous games saw you battle through up to 15 different eras using any of up to 21 different civilisations, *EEIII* has reduced this to five and three, respectively. The result is that these distinctions simply become an excuse to fractionally alter the gameplay, rather than giving any kind of genuine feeling of technological progress, or of guiding a unique civilisation through its development.

To be fair, these changes could have made the game better if not for the fact that these are the mere tip-of-the-iceberg when it comes to how much this game has been dumbed-down. Battles, resource-gathering and diplomacy have all become victims of an attempt to appeal to the casual gamer. This simplified gameplay is something that users and critics alike have been asking for, but this game goes too far and simply doesn't have the production values or ease-of-flow gameplay to pull off such casual appeal.

Once you get into the game itself, unlimited resources and weak AI mean that once you've survived the first 15 minutes, you're pretty much guaranteed to win the game… but you'll still need to slug it out for an hour or two to claim victory. In Domination Mode (a new game type, heavily 'inspired by' *Rise of Nations* but without the fun), the merely tedious becomes unbearable, as you're forced to endure a string of largely undifferentiated repetitive gameplay while waiting for your upgrade to the next era. Think of it as playing *Civilization*, only every single battle takes two hours to resolve. It does come with an auto-resolve option, but this game doesn't have nearly enough depth to make even that enjoyable.



Add to this a whole slew of other complaints: graphics glitches; truly appalling path-finding, especially on water; high requirements for mediocre graphics; level design that seems deliberately tailored to frustrate and annoy, and unit voice-overs that are guaranteed to have you playing with your speakers turned off. This is, quite simply, not a game that should have been released. In an effort to appeal to the masses, Mad Doc has delivered a game that appeals to no-one, and has heavily tarnished the reputation of the franchise.



Developer **Mad Doc Software**
Publisher **Sierra Entertainment**
Website **www.empireearth3.com/**

VERDICT

Tried to do something a bit different; it didn't crash

Everything else

SCORE **3.0** OUT OF 10









Pro Evolution Soccer 2008

David West scores a goal and runs around like a lunatic... virtual style.

After a rusty debut in the next gen arena last year with the disappointingly cut down *PES6*, Konami is back with the latest instalment of what many consider the ultimate in soccer simulations.

The most notable features that Konami has brought to the table this year are the Teamvision AI system and the ability to manually dive. While the latter is an odd choice for a hardcore soccer game, Teamvision AI is of greater interest. Konami claims that the AI opponent adapts to the users playing style and makes adjustments based on this. Use a particular play too much (such as a run down the wing, cross, score, repeat) and the defence will suss you out and shut down that option. While the feature definitely works it is quite subtle and in practice merely results in the opposition appearing slightly more intelligent in defence, as opposed to having a revolutionary impact on how the game is played.

Subtle additions to player animation and physics do a good job of rounding out the whole *PES* experience. Player models now move more fluidly and have a greater number of animation cycles and reactions in play. All this adds to the realism of the game as players pull at each others shirts, argue with the referee and tumble and roll around with great variety upon being flattened. The ball this year is again treated as its own entity and feels weightier and more realistic than previous outings.



The graphics are a mixed bag, however. While the game is an improvement on previous versions it falls behind other sport games on the system, including EA's *FIFA 08*. The game at its furthest view definitely doesn't look 'next gen' but does the job nicely. Closer up you begin to see the fruit of Konami's efforts. Player models are fantastic and for the most part accurately depict their real life counterparts. We often found ourselves pausing the game to zoom in on the faces of favourite players. This graphical goodness comes at a cost though, as there is some shocking slowdown in the replays.

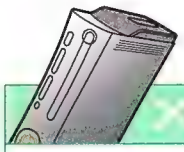
At the time of writing online play was frustrating at best, even after a recent update over LIVE. The game is a hassle to play online with way too much slowdown; until this is fixed it's nothing to get excited about.

The same old problems that have been the Achilles heel for *PES* are still present, though – licensing and presentation. The lack of team and player licences has always been a sore point for soccer fans. While the situation has improved, *PES* is left in the dust by *FIFA*'s immense amount of official clubs and competitions. What we have instead is the fictional Master League. It's not the deepest experience in the world, but it is extremely addictive building your team up through the career mode and taking them to the heights of international soccer.

Presentation has never been *PES*'s strong point and while the commentary is considerably improved, the music and menus are somewhat basic and serve little more than to get you into the real goodness on the pitch.

That my friends is what it's all about. Despite our concerns, at the end of the day once you take the field all that falls to the wayside as *PES* is just amazingly fun to play. It's as simple as that. Sure there may be a whole lot that *PES 2008* doesn't nail but fortunately the one thing it does completely overshadows its failings. Everything feels fluid and the game flows at a brilliant pace that hooks you in and won't let you go until next year's version rolls around. There is no greater feeling than being on the end of a well worked goal and despite being slightly easier to score in this year's version, every goal has to be worked for and brings immense satisfaction.

PES 2008 plays a brilliant game of soccer but really needs to push itself further to maintain its crown. It's still the *PES* we all know and love but that's half the problem as the game hasn't evolved a great deal in recent editions and is begging to be brought into the next generation.



Developer **Konami**
Publisher **Atari**
Website **http://uk.games.konami-europe.com/game.do?idGame=149**

Other platforms **PC, PS3, PS2**

VERDICT

Still the best playing soccer game on the market; player models look great

Licensing and presentation; Improvements too minor

SCORE **8.0** OUT OF 10

New Years resolution **fulfilled?**

Make your resolutions for 2008 reality by enrolling in IT at Monash.

Monash is IT. An IT degree from Monash can progress your future in all areas of IT.

Undergraduate and postgraduate degrees are available in:

- multimedia
- computer science
- games development
- software engineering and more

Go to **www.infotech.monash.edu** to upload your future!

CRICOS Provider: Monash University 00008C



MONASH University
Information Technology

CULTURESHOCK

Everything you need to know about geek film, music and literature.



Cashback

DVD Distributor: Madman Director: Sean Ellis
Starring: Sean Biggerstaff, Emilia Fox

We've a soft spot for dark self-discovery/romantic comedies like *Garden State*, *Clubland* and *Look Both Ways*. Not sure why. They're essentially all the same.

Anyway, *Cashback* is yet another contender in this rather crowded genre. It's about a young arts student named Ben who finds himself suffering from insomnia after breaking up with his girlfriend. After realising he's not going to get a proper night's sleep any time in the near future, he applies for a job at the supermarket. Cue the usual assortment of quirky, fruity and downright nutty characters that you get in this sort of movie – including the obligatory weird but undeniably attractive female co-worker – who all, as Ben soon discovers, have their own ways to kill time and amuse themselves when on the job. Ben soon develops his own way of staying sane. He imagines himself pausing time, stripping female shoppers of their clothing and sketching them.

Sounds creepy in a synopsis, but it's handled well on screen. *Cashback* won't get any prizes for originality, though. It's a genre flick, plain and simple. The character archetypes, the ending and the lead's knack for making amusing observations – you've seem them all before. That's not to say it isn't good. The acting is pretty flash and, yeah, the nudity thing – which could've been really tasteless and gross – works brilliantly. There are a number of comments made by Ben, a few scenes – particularly those relating to his youth – that probably ring true for every non-alpha male. Pretty much, *Cashback* is *Garden State* all over again. Only with more tits. **CT**

SCORE 7.5 OUT OF 10



Rescue Dawn

DVD Director: Werner Herzog
Starring: Christian Bale, Zach Grenier

Based on the experiences of Dieter Dengler, a US pilot who was shot down over Laos during the early days of the Vietnam War, *Rescue Dawn* is yet another 'behind enemy lines' flick. One that, perhaps worryingly to some of you, has drawn considerable criticism from the relatives of those Dengler was imprisoned with. The man himself has stated that the depictions of some of his former prisoners of war are downright false and disrespectful. Does this mean that *Dawn* is crap? Hardly. Watch it as a war flick rather than a re-enactment of Dengler's wartime adventures and you'll find that it's pretty good. Director Werner Herzog – who's also done a documentary of the subject – has made a movie that feels genuinely unique, even though the story of a pilot getting shot down and captured before engineering a cunning escape plan has been told many times before.

Dawn is slow. Ponderous. Indeed, between when Dengler gets shot down and when he makes his bid for freedom, a good hour or so of very little passes by. The dialogue between he and his follow prisoners is whispered and related mostly to the business of freeing themselves. The preparations for the escape are shown down to the last detail. The snail's pace at which Herzog lets the plot unfold may infuriate you, but we can't really say we found it boring. Christian Bale – who lost a mess of weight to play Dengler – is probably what saved us from falling asleep, though. **CT**

SCORE 7.0 OUT OF 10

Bladerunner: The Final Cut

DVD Distributor: Warner Bros Director: Ridley Scott
Starring: Harrison Ford, Rutger Hauer, Sean Young



It could be argued that there's absolutely no reason to keep updating *Bladerunner*. Surely, Scott had his chance, with the 1992 Director's Cut? Well, you could think that, but, frankly, you'd be wrong.

In the *Final Cut*, not only has Ridley Scott breathed new life into a classic piece of dystopian sci fi, but he's also created an object lesson in how to put together a remastered, and re-cut – and in some cases re-shot – classic. Mr Lucas, are you paying attention?

There's a raft of subtle changes that might not look much on paper, but on the screen, it's almost like watching the film again for the first time. The soundtrack has been remastered for 5.1 playback, the original film stock scanned digitally (with effects footage scanned in at a whopping 8,000 lines per frame), and a number of edits and new elements have been introduced. Most notable is the flight of Roy Batty's dove, which now actually flies off into a bleak night sky, and the addition of greater levels of detail in a lot of the long shots of future Los Angeles. Many other shots have been re-cut to trim or properly explore tension in a given scene, and the overall effect is to make a slick film even slicker.

There are a number of versions of the *Final Cut* being released, but the one that any serious fan has to own is the *Ultimate Collector's Edition*. This five disc monster comes in its own carry case and features more extras than... than a thing with a lot of extras, and includes every version of Bladerunner ever made. **DH**

SCORE 8.5 OUT OF 10

GEECCHIC

A girl's eye view of the geek side



A desktop, by any other name

Naming your computer takes Deep Thought. New columnist **Zara Baxter** has deep thoughts in abundance.

Having just bought a spiffy new machine, I wanted to name it. I name all my gadgets, from PDAs and phones through to laptops and desktops. I'm not alone in anthropomorphising my cybernetic companion. Fictional computer names run the gamut from unique and ingenious – Orac, Wintermute – through cybernetically inspired – Multivac, First Universal Cybernetic-Kinetic Ultra-micro Programmer, Hex – to suspiciously oedipal – Mother, Jane. Some even cover the bleeding obvious, such as The Engine, The Machine and, of course, *Star Trek*'s Computer.

It's not just fictional computers that have awful names. Back when I was a lass, it seemed like every computer was named after wizards, characters from *Lord of the Rings*, famous swords or battles. Merlin, Glamdring and Gandalf pinged each other all day long in University computer labs the world over.

Faced with the underwhelming nominative creativity of early geeks, Don Libes put together RFC 1178: 'Choosing a Name for Your Computer'. Among such common sense suggestions as "Don't use antagonistic or otherwise embarrassing names" and "Don't use your own name", Libes recommends that you use themed names.

There's an idea that I can get behind, but because I wanted to be a bit more interesting than naming my computers Galadriel, Arwen and Thorin, my desktops are named after characters in Iain M Bank's science fictional '*Culture*' novels.

The Culture is a future where the leftist socialist anarchists won, which sets it apart from the usual Heinleinian right-wing militaristic futures that science fiction seems to specialise in. The Culture features massive interstellar ships (more accurately, Minds, since they are vast Artificial Intelligences) that are politically astute, manipulative, and have their own agenda, and are frequently entangled in the plot of the novels. These spaceships have suitably impressive names, such as "No More Mr Nice Guy", "Frank Exchange Of Views", "I Thought He Was With You", "Just Another Victim Of The Ambient Morality" and "Charming But Irrational".

If you think that powerful AIs in the form of immense warships should have names that are a bit less silly, you're not alone. At some time in the past, another advanced civilization came into contact with the Culture, and having seen what the ships named themselves, suggested that such powerful vessels ought to have names with a little more gravitas.

The ships took this reproach very seriously. In an early Banks novel, *Use of Weapons*, there's a ship named "Very Little Gravitas Indeed", later on, in Excession, "Zero Gravitas" appears, and later again, we find "Experiencing A Significant Gravitas Shortfall" in *Look to Windward*. Banks suggested, in an interview with UK newspaper The Guardian, that there are More Where That Came From.

I'd name my computers after Culture ships, but sadly Windows limits me to 15 characters. So I took the next best option and named my computers after Banks' characters.

My new system, since it's a speedy build designed to run *Crysis* at Very High settings is now named Gurgeh after the lead character in Bank's novel *The Player of Games*. Obviously.

But that brings us to the grandfather's sword problem. Long ago, your great-great-great-to-the-umpty grandfather won a mighty sword in battle, and it's still in the family. Of course, it had the hilt knocked off in an accident in the 1600's, so that was replaced by the swishy wire one. And there was a ding in the original Damascus steel, so it's now Sheffield's best. And the wrapping on the hilt gets changed every twenty years, and someone nicked the ruby…

But it's still grandfather's sword, handed down for 17 generations.

Just like your computer is the same one, no matter how much you upgrade it. Even when you stripped everything out of the case, rebuild from the ground up… and then six months later replaced the case. How much of my computer can I upgrade before it's time to give it a new name? I could side with Microsoft and rename it after six or more major hardware changes. But here's where my clever computer naming theme kicks in. Banks' characters have six names each, meaning I can do a few switcheroos while still maintaining the illusion that it's the same system.

> "I'm going to be upgrading soon, and I'm already considering the new name - Advil? Ecstasy?"

At least laptops are easier in that regard. Harder to upgrade, for starters, and you're pretty much guaranteed to keep the same case throughout. My laptops have their own naming scheme, I should point out. Each iBook or MacBook I own is a small white rounded thing that keeps me happy and reduces the pain of being away from my desktop. I've called them Aspirin, Placebo, Zoloft and Prozac. I'm going to be upgrading in February, and I'm already considering the new name – Advil? Panadol? Ecstasy? Suggestions are welcome.



Got some geeky naming schemes?
zbaxter@haymarketmedia.com.au

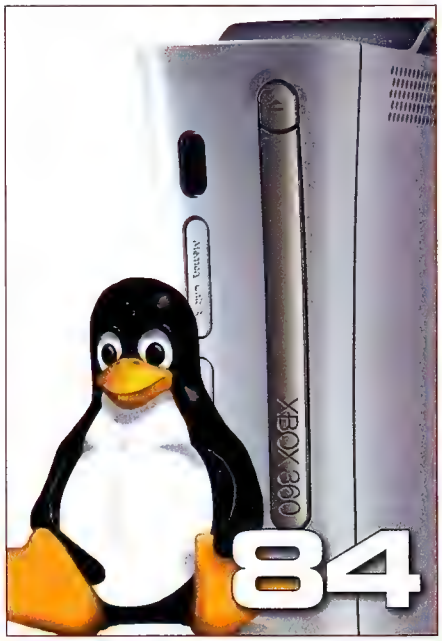
TECHNIQUE

HANDS-ON TUTORIALS FOR THE TECHNICALLY INCLINED

It's a great month to be code-monkey. Our two tutorials are completely tool-free – no saws, no drills, no need for a secret workshop that your partner doesn't know about. All you need are nimble fingers and an eye for detail…

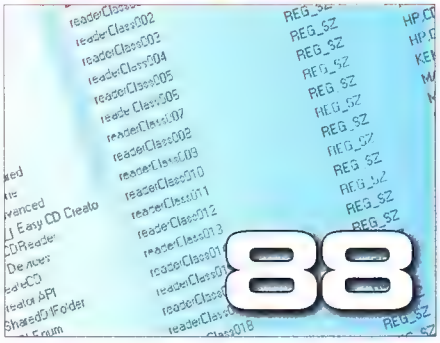
And an Xbox 360 if you want to take advantage of our first words of wisdom, as we show you how to hook up the box'o'fun to a Linux system for media streaming joy. Our second tutorial takes you through creating your very own program, a simple Registry tweaker. Why let so-called companies dominate your software life – make your own!

And finally, there's the usual suspects – Chris Taylor and Dan Rutter with their usual servings of educational sweetness.











TECHNIQUE CONTENTS

Linux and the Xbox 360 84
Leigh Dyer delves into the mystical realm of the penguin and offers us a couple of handy solutions to the age old problem of making Bill Gates play nicely with Linux.

Code your own Registry Tweaker 88
Logan Booker breaks out the code and walks us through creating an entire – and very handy – program from scratch.

Atomic.edu 94
This month Chris Taylor looks at industry qualifications and what they can do for you. Do you really need that Cisco certificate?

IO 96
It's the usual array of tough tech questions, but as always Dan Rutter rises to the occasion.

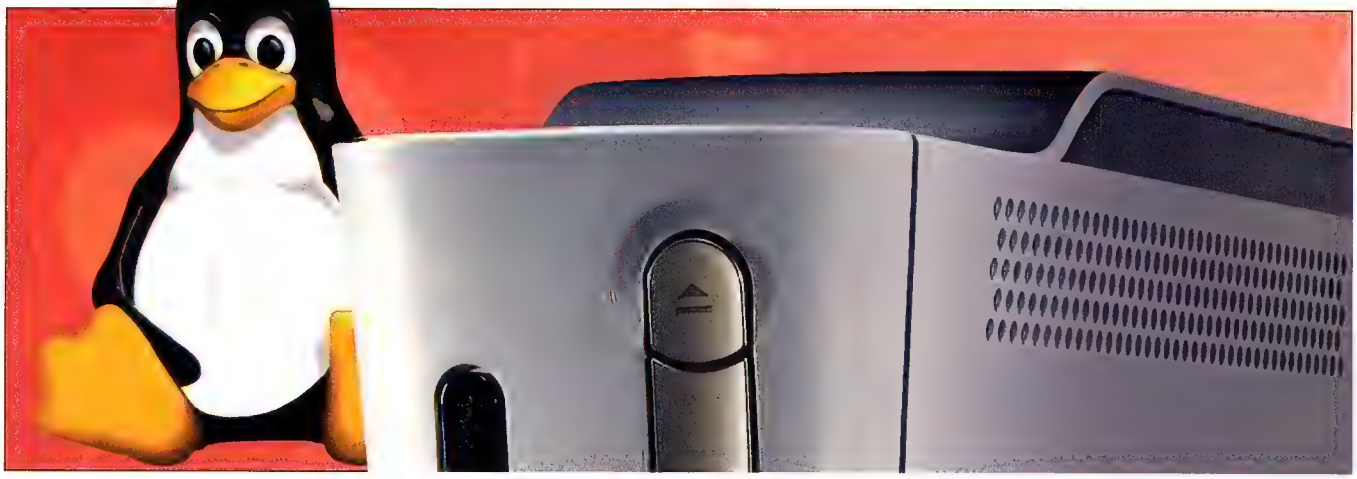
Fallout 98
It's just another day in the Spectres for Commander Shepard, and another day in hell for his crew.



Win a PocketSurfer2 of your very own!

We've got a fabulous mobile internet device to give away to a lucky reader! It delivers a rich online experience on the go, anywhere, anytime, and is worth $399. Want it? Go to...

www.atomicmpc.com.au/competition



DIFFICULTY **INTERMEDIATE**

360 Linux love

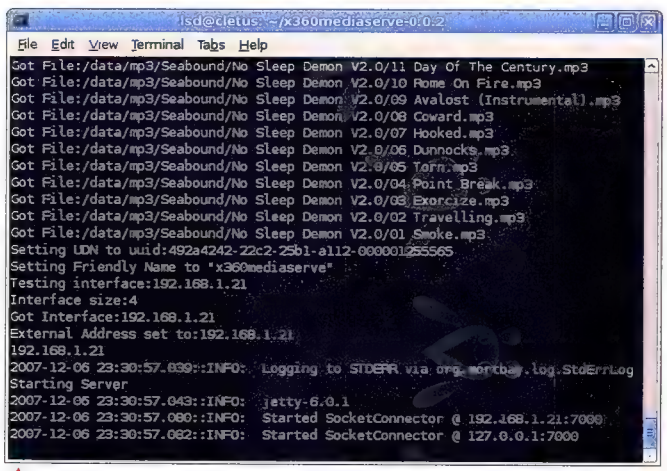
Leigh Dyer looks at making a match between two very odd partners – will the penguin play nicely with Bill?

The Xbox 360 is more than just a games console: it's Microsoft's play for the loungeroom, so it comes packed with media streaming features. That streaming is built on a protocol called Universal Plug and Play, or UPnP, but the developers seemed to have forgotten bits of the standard along the way, so the 360 can only officially stream from Windows Media Connect.

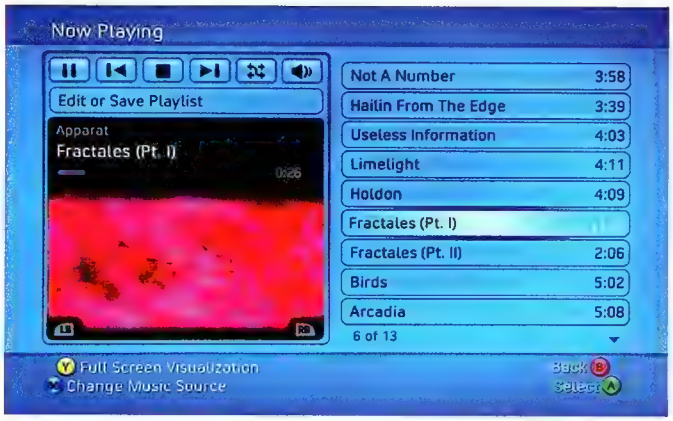
However, hackers have found the secret sauce that the 360 needs to work, and have created a bunch of alternative media streaming solutions that don't rely on Windows Media Player, or even Windows at all. With the right tools, your Linux box can make a fantastic 360 media server.

The easy option: x360mediaserve

If you're having a party tonight and you need streaming MP3s with minimal fuss, x360mediaserve (http://sourceforge.net/projects/x360mediaserve/) is the pony to bet on. It only streams audio files – MP3s primarily, though it can transcode other files to MP3 on-the-fly – but it's easy to set up, and it works well. Follow these steps to set it up:



x360mediaserve re-scans your MP3s each time it runs, but it's otherwise great.



MP3s with x360mediaserve work just as they would from a Windows box.

1) x360mediaserve is a Java application, so you need to install some kind of Java virtual machine. GCC's open-source JVM will do the job here, and you might already have it installed – try running 'java –version' to check. If that fails, you'll have to install the appropriate package for your distribution ('java-gcj-compat' on Ubuntu).

2) Download x360mediaserve from its website, and extract it into your home directory:

```
tar zxvf x360mediaserve-0.0.2.tar.gz
```

3) Enter the x360mediaserve folder and run its start script:

```
cd x360mediaserve
./start
```

4) Open the configuration site, at http://localhost:7000/configure, in your browser. Enter a value for the Music Dir (specify a folder with just a few files in it for now – you can change it later once you're sure it's working), and hit Send.

5) Once x360mediaserve has finished scanning your music folder, open the Music section on your 360's Media blade, and search for a computer to connect to. Connect to 'x360mediaserve :1' when it appears, and try playing some files.

Once you've confirmed that it's all working, you can go back to the configuration site and point it at your complete MP3 collection. Scanning them in does take time, though it's not too bad – my 40GB collection took just a few minutes. Unfortunately, the scan data isn't cached, so your files are re-scanned each time x360mediaserve is started, but for most collections that will be an annoyance, not a show-stopper.

The sexy option: FUPPES

Don't ask me what's with the name, but FUPPES (http://fuppes.ulrich-voelkel.de/) is the best 360 streaming option for Linux today. It handles MP3s better than x360mediaserve, since it caches file information in a database, and it also handles images and video. FUPPES is still a young project, so there aren't any official stable releases or handy distribution packages, but you can follow these steps to install it from source code:

1) Install all the packages that FUPPES depends on to build. You'll need GCC, of course, as well as a number of libraries (LAME, PCRE, SQLite, FAAC, FAAD, uuid, libxml, and libtag), other build tools (autoconf, automake, libtool), and a copy of Subversion to download the source code. On Ubuntu, this will install everything you need:

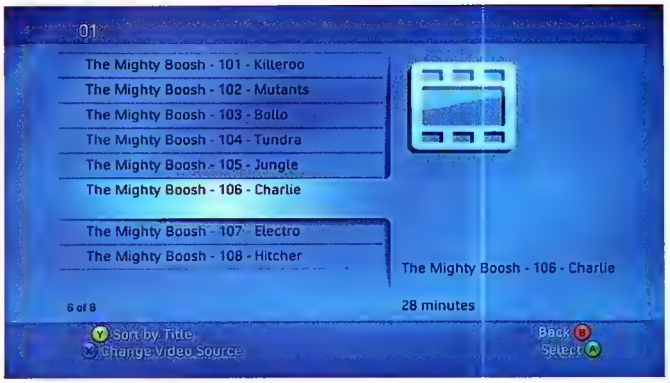
```
sudo apt-get install build-essential liblame-dev
  libpcre3-dev libsqlite3-dev libflac-dev libfaac-
  dev libfaad2-dev uuid-dev libxml2-dev libtag1-
  dev autoconf automake1.9 libtool subversion
```

2) Use Subversion to grab the source code to FFmpeg, a media conversion library and tool, and then compile and install it. We'll install it (and FUPPES) into a new '/usr/local/fuppes' folder, so it doesn't conflict with any other FFmpeg installations on your system:

```
svn checkout svn://svn.mplayerhq.hu/ffmpeg/trunk
  ffmpeg
cd ffmpeg
./configure --prefix=/usr/local/fuppes/ --enable-
  gpl --enable-pp --enable-pthreads --enable-
  shared --enable-libfaac --enable-libfaad --
  enable-libmp3lame
make
sudo make install
```

3) Grab FUPPES, also using Subversion, and configure it, ready to build:

```
svn co http://fuppes-svn.ulrich-voelkel.de/trunk
  fuppes
cd fuppes
```



FUPPES on the big screen, with DivX/XviD support thanks to the December update.

```
autoreconf -vfi
./configure --prefix=/usr/local/fuppes/ --enable-
  video-transcoding
```

4) Check the output of the "configure" command, to ensure that video transcoding with FFmpeg has been enabled, and then complete the installation:

```
make
sudo make install
```

5) Add your FUPPES folder to your shell's path, and the FFMPEG libraries to your library path, and then run FUPPES, entering the name of your network device if it asks for it:

```
export PATH=$PATH:/usr/local/fuppes/bin
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/
  local/fuppes/lib
fuppes
```

Those 'export' commands only stay valid for the current terminal session, but you can make them persistent by adding them to the '.bash_profile' file inside your home directory.

6) Quit FUPPES by hitting 'q' and then Enter. It should have created a '.fuppes' folder in your home directory, and a 'fuppes.cfg' file inside that. Open that file in a text editor and make the following changes:

* Inside the <shared_objects> tag, add <dir> tags pointing to a directory holding some of the files you want to share:

```
<shared_objects>
   <dir>/home/lsd/MP3s</dir>
   <dir>/home/lsd/Videos</dir>
</shared_objects>
```

As with x360mediaserve, pick folders with just a few files for now – you can go nuts with your entire collections once everything's working.

* Find the '<device_settings>' tag, and the '<device name="Xbox 360">' section with it. Delete the Xbox 360 device section, and replace it with the following:

```
<device name="Xbox 360" virtual="Xbox 360"
  enabled="true">
   <user_agent>Xbox/2.0.\d+.\d+ UPnP/1.0 Xbox/2.0.\
  d+.\d+</user_agent>
   <user_agent>Xenon</user_agent>
   <xbox360>true</xbox360>
```

MULTICASTING

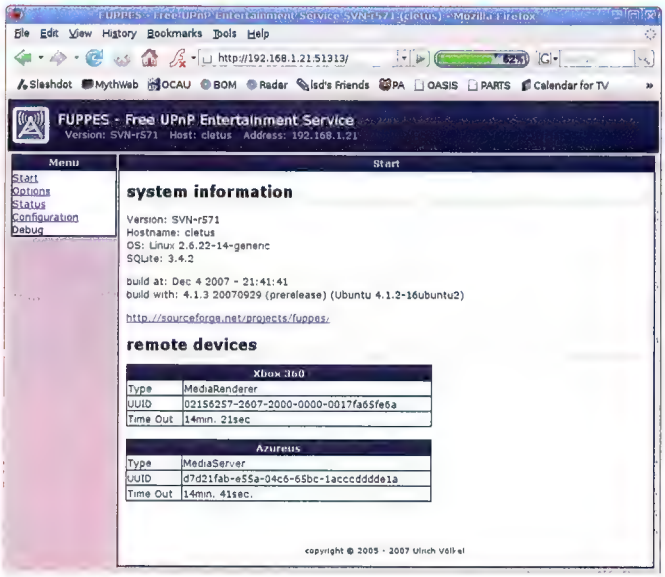
Before you can stream anything, you need make sure that IP multicasting is enabled on your Linux box. Multicasting allows multiple hosts to receive the same packets from a single source, and on the 360, it's used to broadcast searches for streaming hosts. Every modern Linux distribution should have multicasting built in to the kernel, but not all of them configure your network interfaces to listen for multicast packets.

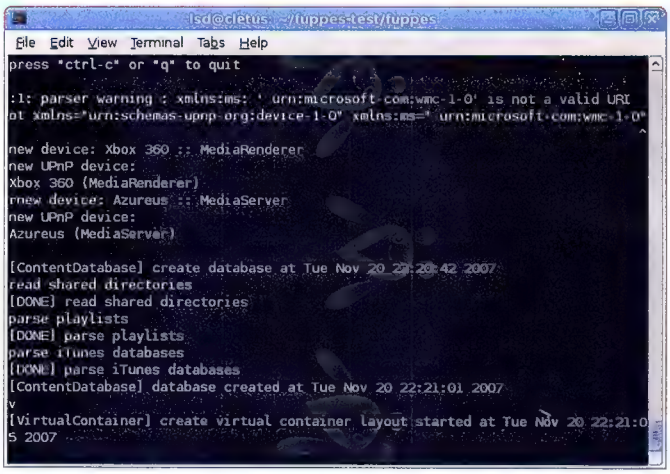
The proper way to enable multicast is by adding a route for the local multicast address range, using the 'route' command. Substitute your own interface name if it's not 'eth0':

```
sudo route add -net 224.0.0.0 netmask
  240.0.0.0 dev eth0
```

Try searching for your PC again – with any luck, the 360 will be able to detect it now. If it doesn't work, you can try the brute-force method, which forces your network interface to listen to all multicast traffic on your LAN. Unless you have a very strange or busy LAN, this should work fine:

```
sudo ifconfig eth0 allmulti
```





FUPPES has both a simple command-line interface and a nifty web UI.

```
  <description_values>
    <friendly_name>%s %v : 1 : Windows Media
  Connect</friendly_name>
    <model_name>Windows Media Connect compatible
  (%s)</model_name>
    <model_number>2.0</model_number>
  </description_values>
  <file_settings>
    <file ext="mp3"><type>AUDIO_ITEM_MUSIC_
  TRACK</type></file>
    <file ext="jpg"><type>IMAGE_ITEM_PHOTO</
  type></file>
    <file ext="avi">
      <type>VIDEO_ITEM</type>
      <mime_type>video/avi</mime_type>
    </file>
  </file_settings>
</device>
```

7) Copy the 'vfolder.cfg' file from the FUPPES source code folder in to your ~/.fuppes folder. This file defines how FUPPES maps the files in its database in to a directory structure – for instance, it arranges your MP3s in to Artist and Album categories. Find the Xbox 360 <vfolder_layout> section, and enable it:

```
<vfolder_layout device="Xbox 360" enabled="true">
```

8) Run FUPPES again, and hit 'r' and Enter to rebuild the content database. When that finishes, hit 'v' and Enter to rebuild the virtual folder hierarchy.

9) Fire up your 360, open the Music or Video sections on the Media blade, and search for a computer to connect to. Select the FUPPES option from the list, and your files should appear.

If your 360 has the latest system software as of December 2007, you should find that most videos play just fine. This update added support for AVI files with MPEG-4 SP and ASP video (that includes XviD, and DivX as of 5.0), and MP3 or AC3 audio, which should cover about 95 per cent of downloaded or ripped videos.

You'll probably still find some files that don't work though, especially if you have some old DivX 3 files still kicking around, or files in formats like Matroska or Ogg. If you just have the odd file, the easiest fix is to convert those files to a supported format. FFmpeg is a great tool for the job – it can convert a file with a single command:

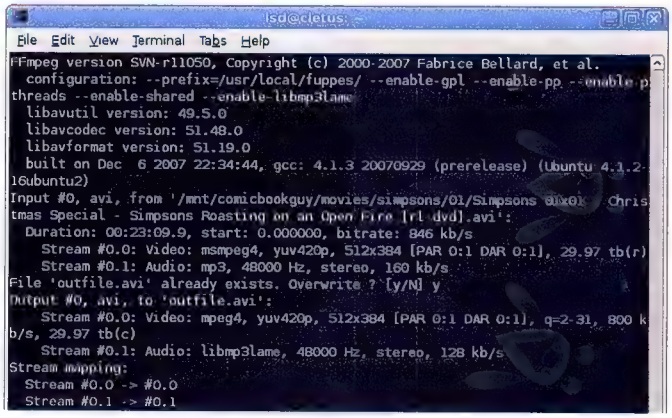
```
ffmpeg -i infile.avi -ab 128k -acodec libmp3lame
 -vcodec mpeg4 -b 800k outfile.avi
```

These options give you a file with MPEG-4 ASP video at 800kbit/s, and MP3 audio at 128kbit/s: fairly typical options for an AVI file. You can tweak the bitrates up or down to alter the trade-off between file size and quality. Alternately, try two-pass encoding: run FFmpeg once with a '-pass 1' option added, and again with a '-pass 2' added. This takes twice as long, but it can significantly improve the output quality.

If you have a lot of incompatible files, it might be easier to enable transcoding support in FUPPES. This uses the FFmpeg libraries to convert AVI files to WMV on-the-fly, so anything that FFmpeg can read – and it can read just about everything – will play on the 360. To enable transcoding, edit your 'fuppes.cfg' file again, and find the '<file ext="avi">' section inside the Xbox 360 device section. Add these lines after the 'mime_type' line:

```
<transcode enabled="true">
  <transcoder>ffmpeg</transcoder>
  <ext>wmv</ext>
  <mime_type>video/x-ms-wmv</mime_type>
  <video_codec>wmv2</video_codec>
  <audio_codec>wmav1</audio_codec>
  <video_bitrate>4400000</video_bitrate>
  <audio_bitrate>128000</audio_bitrate>
</transcode>
```

Restart FUPPES and try playing an AVI file; you'll see a bunch of debugging messages and a lot of CPU usage on the FUPPES terminal as it transcodes the file, but on the 360 it should just play as you'd expect. At the time of writing, you can't seek within transcoded files, which can be annoying, but I wouldn't be surprised if this is supported by the time you read this.



FFmpeg, tearing through MPEG-4 encoding like nobody's business.

360 CONTROLLERS UNDER LINUX

One great thing about this generation of consoles is the way they've done away with proprietary controller ports: everything's either wireless or USB, and the 360 is no exception. Of course, Microsoft invented its own protocols rather than sticking to the USB human input device standards, but with the 'xpad' add-on driver, you can get 360 controllers working on your Linux system.

The xpad driver supports most controllers, including standard wired controllers, wireless controllers (using the Wireless Gaming Receiver, which plugs in via USB), and even alternative controllers like dance mats and my personal favourite, the Guitar Hero II X-plorer guitar controller. If your distribution includes the xpad driver, all you need to do is load it:

```
sudo modprobe xpad
```

If that doesn't work, you can build it from source:

1) If you're using a pre-built kernel from your distribution (hey, even some of us do that these days), you need to install the kernel headers package. This will do the job on an Ubuntu system:

```
sudo apt-get install linux-headers-generic
```

2) Download the xpad files from the Xbox-Linux project in to a new folder:

```
mkdir xpad && cd xpad
wget "http://xbox-linux.cvs.sourceforge.net/*checkout*/xbox-
  linux/kernel-2.6/drivers/usb/input/xpad.c"
wget "http://xbox-linux.cvs.sourceforge.net/*checkout*/xbox-
  linux/kernel-2.6/drivers/usb/input/xpad.h"
```

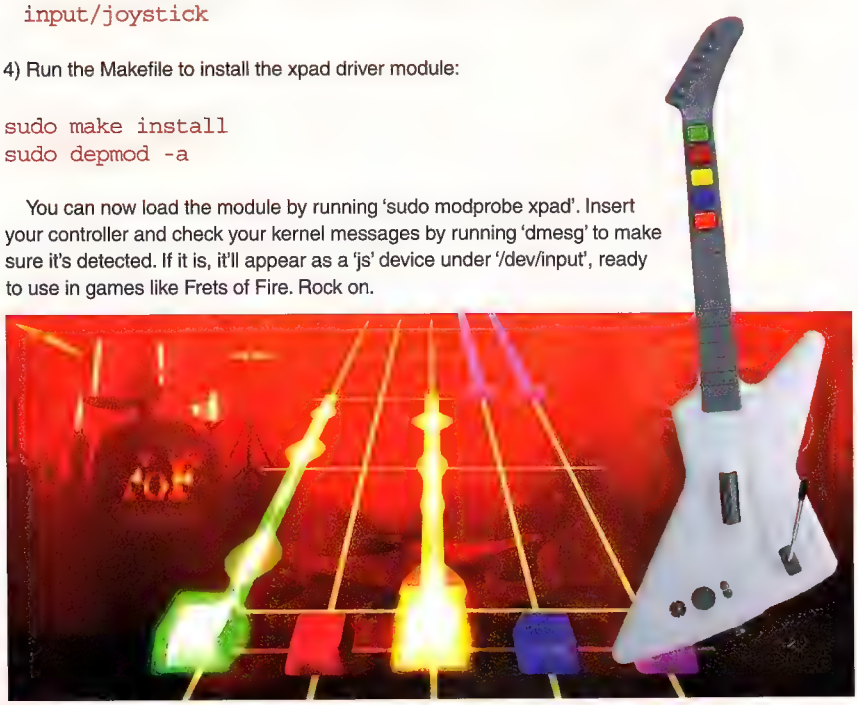
3) Create a new text file called 'Makefile' inside that folder, and enter the following:

```
obj-m := xpad.o
KDIR := /lib/modules/$(shell uname -r)/build
EXTRA_CFLAGS=-I$(shell pwd)
all:
    $(MAKE) modules -C $(KDIR) SUBDIRS=$(shell pwd)
install:
    mv -f xpad.ko /lib/modules/$(shell uname -r)/kernel/drivers/
  input/joystick
```

4) Run the Makefile to install the xpad driver module:

```
sudo make install
sudo depmod -a
```

You can now load the module by running 'sudo modprobe xpad'. Insert your controller and check your kernel messages by running 'dmesg' to make sure it's detected. If it is, it'll appear as a 'js' device under '/dev/input', ready to use in games like Frets of Fire. Rock on.



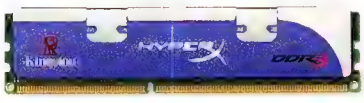
▲ **Real rock stars don't use keyboards – they use crappy plastic guitars.**



High-performance memory for gamers.

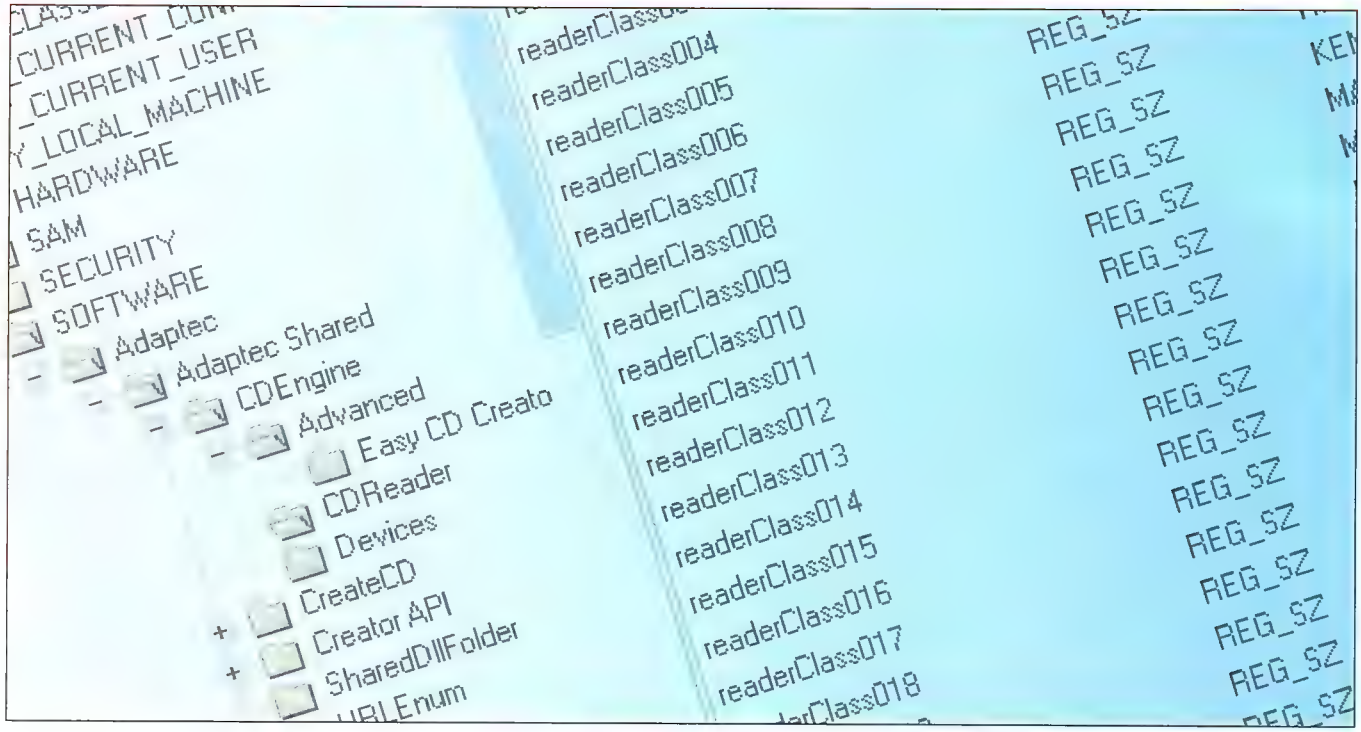
Now with DDR3 technology, Kingston's HyperX® memory offers faster speeds and is backed by 100-percent testing and a lifetime warranty.

For more information, ask for HyperX by name at your local computer reseller or visit kingston.com/hyperx today.



Kingston TECHNOLOGY HYPER

©2007 Kingston Technology Company, Inc. 17600 Newhope Street, Fountain Valley, CA 92708 USA. All rights reserved. All trademarks and registered trademarks are the property of their respective owners.



DIFFICULTY **INTERMEDIATE**

Make your own Registry tweaker in VB.NET

Logan Booker shows you how you can write a custom Registry tweaker using Microsoft's Visual Basic 2008 Express Edition.

Wouldn't it be great if you could just click a button and apply all your favourite Registry tweaks to a fresh install of Windows? Without the aid of a utility, the easiest way to do this is to put all your tweaks in a .REG file, double click on it, and let the operating system do the work.

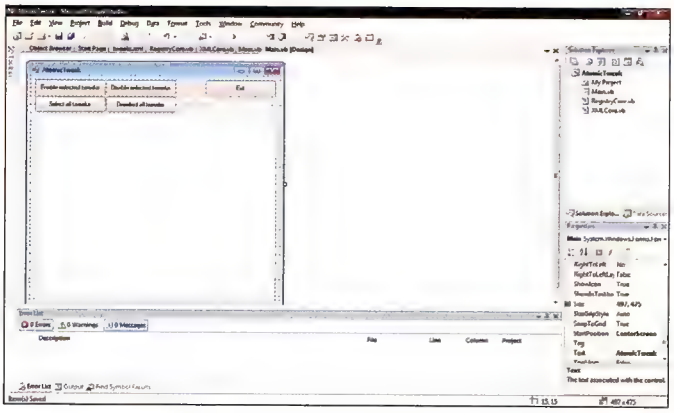
But what if you don't want to apply every single tweak you know? What if you need to disable one temporarily to troubleshoot? That's where AtomicTweak steps in.

In this tutorial, you'll learn a bit about user interface design, interacting with the Registry and manipulating XML files.

SETTING UP

Before you start, download a copy of Microsoft's Visual Basic 2008 Express. Don't panic, it's free. The most complex part is getting a registration code, but even that's simple.

Point your favourite web browser to **go.microsoft.com/?linkid=7729280** to download the web install. As long as you follow the onscreen prompts, you shouldn't run into any problems.



It may not look simple, but it's easy to understand.

Design me an interface!

Once you have Visual Basic 2008 installed (see the 'Setting up' boxout), you'll need to create a new project. Go to File > New Project, and select 'Windows Application' from the New Project Window. In the 'Name' text box, type in 'AtomicTweak', then hit 'OK'. VB should provide you with a nice, empty project to muck about in.

Before we do any coding, we need to set up the user interface. This is essentially the gateway to your application, and it's important that it is as easy to use as possible.

In the main program window, you should see a form called 'Form1'. Make sure it is selected, and then go to the 'Properties' toolbox in the bottom right corner of the main VB window. Look for a property called 'Text', and in this box type 'AtomicTweak'. The 'Form1' text on the form in the main window should be replaced with 'AtomicTweak'. Then find the property called '(Name)' and change it from 'Form1' to 'Main'.

Next, hover your mouse over the small 'Toolbox' tab in the top left corner of the program window. It should pop out to reveal numerous controls we can place on our form. Find the Button object, and create five of them on our form. Divide the following names among them, making sure to enter the names in the '(Name)' property:



It's easy – and free – to download Visual Basic .NET.

```
btn_EnableTweaks
btn_DisableTweaks
btn_SelectAll
btn_DeselectAll
btn_Exit
```

Feel free to change the 'Text' property of each button to something more suiting of its purpose.

Now we need to place a ListView control on our form. Find it in the Toolbox tab, and drag one onto our form. Change its '(Name)' property to 'lv_Tweaks'. You may have noticed a trend with our naming conventions – the type of control, abbreviated, followed by a common sense name so we can identify it programmatically.

Our second last step in the user interface design department is to move and resize the controls so they're somewhat aesthetically pleasing. Take a look at the screenshot to the left to get an idea of what we did.

Finally, we want to anchor some of the controls so they reposition/resize appropriately when the window is manipulated. If you follow our UI design, select the ListView, find the 'Anchor' property, and select 'Top', 'Left', 'Right' and 'Bottom'. Then select btn_Exit, and anchor that using 'Top' and 'Right'.

Now, press F5 to start debugging the program. You should be able to resize the program window, and the controls will resize/reposition themselves accordingly. You can also set minimum sizes in the Property toolbox to make sure users can't make the window too small, but we'll leave that up to you to figure out.

Eventually, we'll put some logic behind those buttons. But first, let's get the 'back end' coding out of the way.

All's well with XML

To store our tweaks, we're going to use an XML file. The great thing about XML is that it's human-readable and many programs feature in-built support for the format. VB.NET comes with special libraries to interpret XML, and we're not going to let them go to waste.

Go to the root of your C: drive and create a file called 'tweaks.xml'. Open it up, and enter the following:

```
<?xml version="1.0"?>

<tweaks>
  <tweak desc="Disable NTFS last access update
  (improves Explorer performance)."">
    <setting key="HKEY_LOCAL_MACHINE\SYSTEM\
  CurrentControlSet\Control\FileSystem" name
  ="NtfsDisableLastAccessUpdate"  enabled="1"
  disabled="0" type="dword"/>
  </tweak>

</tweaks>
```

Save and close the XML document. This is our basic tweak storage file. With this set up, we can sort out the code to read from it.

From the top menu bar, select Project > Add Module. In the name text box, type in 'XMLCore.vb' and hit OK. A new file should be added to our project, which you can select from the top-right toolbox (the Solution Explorer). Double click on the file.

Once inside the file, you'll see the following:

```
Module XMLCore
End Module
```

Not that exciting, is it? To spice it up, we're going to add some 'Imports', which make it easier for us to access VB.NET's special functions. Above the 'Module XMLCore' line, add the following:

```
Imports System.XML
Imports System.IO
```

This will give us direct access to VB.NET's XML and input/output commands. Now, just below the 'Module XMLCore' line, but staying inside the 'End Module' line, type in this code:

```
    Private Const TweakFilePath As String =
"c:\tweaks.xml"

    Public Enum Setting
        Key = 0
        Name = 1
        Enabled = 2
        Disabled = 3
        Type = 4
    End Enum

    Public Structure TweakInfo
        Dim Description As String
        Dim Tweaks(,) As String
    End Structure

    Public Tweaks As New ArrayList
```

"In this tutorial you'll learn a bit about user interface design, interacting with the Registry, and manipulating XML files."

What we've done here is set up a few things we'll use in the program. The first line sets up a constant that points to our XML tweak file. For debugging purposes, we've stuck it in an easily accessible folder – the root of C:. We suggest you do the same. Later on, we'll move it to the same path as the program.

The second code block has set up an enumeration. It's not 100 per cent necessary for the program to work, but it allows us to remember words instead of numbers when we want to access stuff. By using 'Public', we make this enumeration available to the whole program.



If you get stuck, MSDN (msdn.microsoft.com) is an excellent resource.

The next bit of code is a structure. A structure is a user-defined type – that is, our own, custom way of storing data that we can use anywhere.

The final line of code here simply sets up an array. An array is exactly what it sounds like – a place where we can store a bunch of separate chunks of data we can easily iterate through.

If you thought that code was heavy, wait until you see the next bit:

```
    Public Sub Initalise()
        ReadTweakFile()

    End Sub

    Private Sub ReadTweakFile()
        Dim XMLReader As XmlTextReader = New
XmlTextReader(TweakFilePath)

        Do While Not XMLReader.EOF
            XMLReader.Read()

            If XMLReader.IsStartElement And
XMLReader.Name = "tweak" Then
                Dim newTweak As New TweakInfo
                ReDim newTweak.Tweaks(15, 4)

                newTweak.Description = XMLReader.
GetAttribute("desc")

                XMLReader.Read()

                Dim i As Integer = 0
                Do While XMLReader.Name <> "tweak"
                    If XMLReader.IsStartElement
And XMLReader.Name = "setting" Then
                        newTweak.Tweaks(i,
Setting.Key) = XMLReader.GetAttribute("key")
                        newTweak.Tweaks(i,
Setting.Name) = XMLReader.GetAttribute("name")
                        newTweak.
Tweaks(i, Setting.Enabled) = XMLReader.
GetAttribute("enabled")
                        newTweak.
Tweaks(i, Setting.Disabled) = XMLReader.
GetAttribute("disabled")
                        newTweak.Tweaks(i,
Setting.Type) = XMLReader.GetAttribute("type")
                        i += 1

                        XMLReader.Read()
                    End If
                Loop
                Tweaks.Add(newTweak)
            End If

        Loop
        XMLReader.Close()
        XMLReader = Nothing
    End Sub
```

Okay, a quick lesson on 'exposing'. Instead of making every function of our program accessible to every other function, we isolate stuff. It makes it easier to debug, as we know only certain functions can be 'seen' by everything. The 'Initialise' sub routine is a good example of this. It's public and called by our 'Main' form. Initialise then calls the 'ReadTweakFile' routine, which can only be seen by functions within the XMLCore module.

'ReadTweakFile' may look scary, but its operation is quite simple. The first line opens up the XML tweak file we made earlier, using VB.NET in-built XML reader. Next, we set up a Do Loop that will iterate through our tweak file. The 'While Not XMLReader.EOF' is an exit clause for our loop. EOF stands for 'End Of File', so basically our loop will continue until it reaches the end of the tweak file. Make sense?

Good. The 'Dim' statement is used to define a new variable. Here, we're creating a variable that uses the user-defined type we specified using the 'Structure' command earlier. It will contain the information for a single tweak. The line after it, 'Redim', sets some hard limits for the amount of Registry edits in a single tweak. For us, we'll set it to 16 (0-15), and give each tweak a set of four variables to explain how the tweak is applied.

The next chunk of code iterates through each tweak in the XML file. First, we grab and store the tweak description. Then, we retrieve each individual Registry change required to make tweak work. We grab the Registry key, the name of the value to change, its value with the tweak enabled, disabled, and the data type of value. All this data is stored in newTweak, which is then added to our Tweaks array.

And that's the XMLCore module done!

> **An array is exactly what it sounds like – a place where we can store seperate chunks of data.**

Rigging the Registry

Like we did with XMLCore, create a new module called 'RegistryCore.vb'. In this module will be all our code to make changes to – you guessed it – the Registry.

Editing the Registry with VB.NET is easy. In fact, here's the entirety of the module:

```
    Public Sub ApplyRegistryTweak(ByVal key As
String, ByVal name As String, ByVal value As
String, ByVal type As String)
        Dim actual_type As RegistryValueKind

        Select Case type
            Case "dword"
                actual_type = RegistryValueKind.
```

```
DWord
            Case "string"
                actual_type = RegistryValueKind.
String
            Case "binary"
                actual_type = RegistryValueKind.
Binary
            Case Else
                actual_type = RegistryValueKind.
Unknown
        End Select

        Registry.SetValue(key, name, value,
actual_type)
    End Sub

    Public Function IsTweakApplied(ByVal key As
String, ByVal name As String, ByVal value As
String)
        Dim regValue As String

        regValue = Registry.GetValue(key, name,
"")

        If regValue <> value Then
            Return False
        Else
            Return True
        End If

    End Function
```

Before you go typing this in, make sure to add an import for Microsoft.Win32 at the top of the module, as this gives us access to the Registry editing functions in VB.NET.

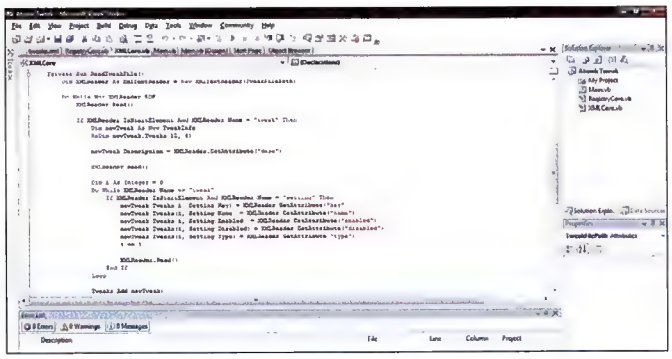
'ApplyRegistryTweak' is a pubic sub routine that edits the Registry to get our tweaks working. The first thing it does is suss out the data type of the Registry key. Then, using the Registry object, we set the value using the variables passed to the routine

'IsTweakApplied' is a check we'll be using in the code for Main.vb It checks to see if a tweak is applied, so we can inform the user. It just compares the variables passed to the function with those in the Registry. It then returns a True or False depending on the result.

The main course

Our final port of call is the Main.vb file. Inside this is the code that controls the logic behind each control on the form.

First, let's set up what the form does when the program starts. The easiest way to create this sub-routine is to double click on the Main form in the Designer view:



XMLCore is the heart of our project. Well, the back end at least.

```
    Private Sub Main_Load(ByVal sender As System.
Object, ByVal e As System.EventArgs) Handles
MyBase.Load
        Initalise()

        PopulateTweakList()
    End Sub
```

Remember out Initialise function in XMLCore? Yep, all we're doing here is loading the tweak file into the program.

What's PopulateTweakList then? Glad you asked:

```
    Private Sub PopulateTweakList()
        lv_Tweaks.Clear()

        Dim i As Integer = 0
        Dim tweak As TweakInfo

        For i = 0 To Tweaks.Count - 1
            Dim lvitem As New ListViewItem

            tweak = Tweaks(i)
            lvitem.Text = tweak.Description
            lvitem.Name = i

            If CheckTweak(tweak) Then
                lvitem.ForeColor = Color.Green
            Else
                lvitem.ForeColor = Color.Maroon
            End If

            lv_Tweaks.Items.Add(lvitem)
        Next

    End Sub
```

This routine puts all the tweaks read from the XML file into lv_Tweaks, the ListView control we created at the start of the project. Before it does anything, it clears the ListView. Then, it creates an empty ListViewItem to be added to the control. We then iterate through our Tweaks array, grab the tweak description, apply it to the Text property of the temporary item, assign it a name that is equal to the tweak's position in our Tweak array (so we can link them together later), and add it to the ListView.

```
    Private Function CheckTweak(ByVal tweak As
TweakInfo) As Boolean

        Dim i As Integer
        For i = 0 To tweak.Tweaks.Length
            If tweak.Tweaks(i, Setting.Key) = ""
Then Exit For

            If IsTweakApplied(tweak.Tweaks(i,
Setting.Key), tweak.Tweaks(i, Setting.Name),
tweak.Tweaks(i, Setting.Enabled)) Then
                CheckTweak = True
            Else
                CheckTweak = False
                Exit For
            End If
        Next

        Return CheckTweak
    End Function
```

You may notice that PopulateTweakList calls the function 'CheckTweak'. You can see the meat of that function above. It calls the IsTweakApplied function from RegistryCore.vb, and returns the True/False result. PopulateTweakList then uses this information to colour the text of the tweak, so the user can see, at a glance, whether the tweak is enabled or not.

```
    Private Sub btn_Enable_Click(ByVal sender
As System.Object, ByVal e As System.EventArgs)
Handles btn_Enable.Click
        Dim lvo As ListViewItem

        For Each lvo In lv_Tweaks.Items
            If lvo.Checked Then
                Dim tweak As TweakInfo =
Tweaks(lvo.Name)

                Dim i As Integer
                For i = 0 To tweak.Tweaks.Length
                    If tweak.Tweaks(i, Setting.
Key) <> "" Then
                        ApplyRegistryTweak(tweak.
Tweaks(i, Setting.Key), tweak.Tweaks(i, Setting.
Name), tweak.Tweaks(i, Setting.Enabled), tweak.
Tweaks(i, Setting.Type))
                        lvo.ForeColor = Color.
Green
                    Else
                        Exit For
                    End If
                Next

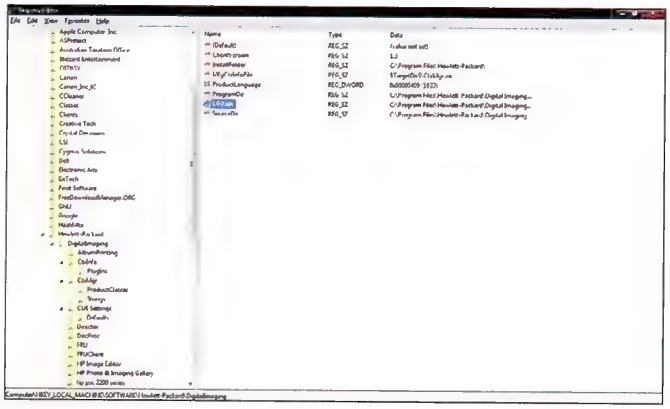
            End If
        Next
    End Sub

    Private Sub btn_Disable_Click(ByVal sender
As System.Object, ByVal e As System.EventArgs)
Handles btn_Disable.Click
        Dim lvo As ListViewItem

        For Each lvo In lv_Tweaks.Items
            If lvo.Checked Then
                Dim tweak As TweakInfo =
Tweaks(lvo.Name)

                Dim i As Integer
                For i = 0 To tweak.Tweaks.Length
                    If tweak.Tweaks(i, Setting.
Key) <> "" Then
                        ApplyRegistryTweak(tweak.
Tweaks(i, Setting.Key), tweak.Tweaks(i, Setting.
Name), tweak.Tweaks(i, Setting.Disabled), tweak.
Tweaks(i, Setting.Type))
                        lvo.ForeColor = Color.
Maroon
                    Else
                        Exit For
                    End If
                Next

            End If
        Next
    End Sub
```



▲ **Use the Registry Editor (regedit.exe) to discover and test new tweaks.**

The code behind our Enable and Disable buttons. They're extremely similar, so much so you could get away with compressing them into a single function, but for the sake of thoroughness we've written both out in full. As our ListView has checkboxes, we can iterate through, find out which ones are checked, and enable/disable the tweak as necessary. We also set the colour of the tweak text depending on what we've done.

```
    Private Sub btn_Exit_Click(ByVal sender As
System.Object, ByVal e As System.EventArgs)
Handles btn_Exit.Click
        Application.Exit()
    End Sub


    Private Sub btn_SelectAll_Click(ByVal sender
As System.Object, ByVal e As System.EventArgs)
Handles btn_SelectAll.Click
        Dim lvo As ListViewItem

        For Each lvo In lv_Tweaks.Items
            lvo.Checked = True
        Next
    End Sub

    Private Sub btn_DeselectAll_Click(ByVal sender
As System.Object, ByVal e As System.EventArgs)
Handles btn_DeselectAll.Click
        Dim lvo As ListViewItem

        For Each lvo In lv_Tweaks.Items
            lvo.Checked = False
        Next
    End Sub
End Class
```

The final chunks of code in our program are straightforward. The Exit button calls Application.Exit to close the program; the SelectAll button iterates through the lv_Tweaks control and checks all the tweaks, while DeselectAll does the opposite.

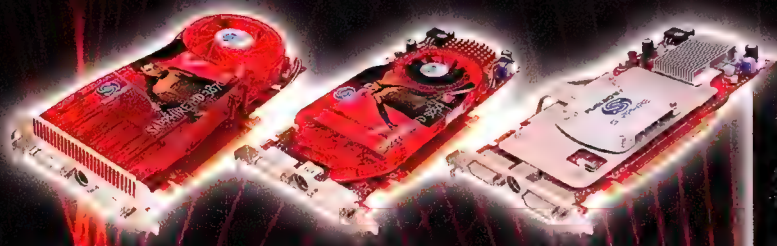
Further improvements

There's a lot more that can be done with this program. The biggest is error catching code. For instance, if the tweaks.xml file doesn't exist, the program will crash. Your first bug fix should be to address this. Another option is to make tweak categories (Services, File System, Start Menu, etc) to make it easier to find certain tweaks.

Hopefully you've learnt a bit about VB.NET and its power. Keep experimenting and you'll be amazed at what you can do with just a few lines of code!

SAPPHIRE The BEST in Gaming

Rocking the Gaming World with.... PCI-E 2.0 DX 10.1 SM 4.1 CrossFireX



SAPPHIRE HD 3870 SAPPHIRE HD 3850 SAPPHIRE HD 3850 Ultimate

HD 3800 Series Press Quote

HardOCP
"HD 3850 is really the star of the show at its price point...the fact that it contains the full 320 streaming processors as the Radeon HD 3870, with simply lower clock speeds means it is one lean mean fully featured machine."

X-bit labs
"But that doesn't change the fact that AMD has produced a killer sub-$200 card here that delivers adequate DX10 performance and has enough muscle to run any DX9 game even at high resolution with the settings maxed out. If $200 is your price ceiling, this is your card."

FiringSquad
"The Radeon HD 3850 looks pretty strong right now..... it outperformed its closest competitor....the GeForce 8600 GTS, and delivered a nice performance improvement over the Radeon HD 2600 XT and 2900 GT."

AnandTech
"The Radeon HD 3850 is so much faster than the 8600 GTS at a very competitive price."

The Tech Report
"Radeon HD 3870 delivers almost exactly the same performance as the Radeon HD 2900 XT, yet the chip is under half the size and brings an astounding near-100W reduction in power use while gaming."

ATi RADEON GRAPHICS | ATi CROSSFIRE X TECHNOLOGY | Certified for Windows Vista

SAPPHIRE

www.sapphiretech.com

HD 3800 Series Award

FRAZPC.PL | Hardware Canucks Gold Award | Hard Tecs 4U Award | PC Gold Award | Elite Innovation | Tutors Choice | Good Value | avision | Value Award | Computer Shopper | avision | Extreme Tech Approved | PC Mag

Authorized Distributors:

ACHIEVA GROUP OF COMPANIES

Proudly Distributed by Achieva Technology
Sydney (Head Office): 02-9742 3288
Melbourne: 03-9561 9899
Brisbane: 07-3857 5969
Perth: 08-9204 2388
www.achieva.com.au

Dove

Dove Electronics Ltd.,
10 Print Place, Middleton, PO Box 33-166,
Christchurch, New Zealand.
Tel: (+64-3) 338 4722 Fax: (+64-3) 338 5564
www.dove.co.nz

©2007, Advanced Micro Devices, Inc., ATI, the ATI logo, Avivo, Catalyst, CrossFire and Radeon are trademarks of Advanced Micro Devices, Inc.
Windows Vista and the Windows Vista Start button are trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.

ATOMIC.EDU

No surfing the Atomic forums during class, students!



Industry and vendor qualifications

Chris Taylor ponders the worth of those bits of paper.

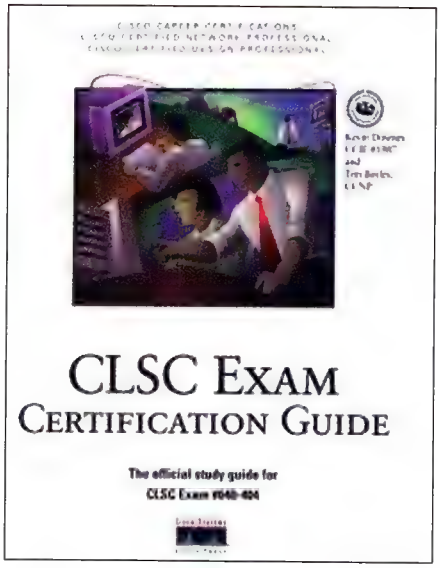
Over the past few months, we've covered IT degrees and diplomas in great detail, so it's about time we look into another form of qualification – 'industry' and vendor-specific courses and certificates such as the Cisco Certified Network Associate (CCNA) and Microsoft Certified Systems Engineer (MCSE). Many universities and TAFE institutes include such programs as part of their curriculum. Others offer them as optional and costly extras. Indeed, these 'industry' certificates can work out very expensive by the time you factor in the books and the examination fee, so the question is, are they worth it? Will having one or two of these certificates to your name actually help you get a job? Once again, we've turned to the forums for answers (**http://www.atomicmpc.com.au/forums.asp?s=1&c=1&t=117263**). The ever-wise segger explains the situation best. "Does having the qualifications dramatically increase one's chance of getting a job or [higher] rate of pay? No. It increases the chance of finding a job somewhat, but generally the first-level qualifications (CCNA, MCSA) are something a large number of applications have and are even sometimes a base expectation of the employer, despite the fact people can work through some of these courses, understand little and gain nothing in terms of learning. Higher level qualifications (such as the CCNP, CCSP and especially CCIE) do make one stand out in the sea of potential employees and demonstrate an even more extreme level of commitment to learning about the technology. Holding such qualifications is seen as an indicator of skill by employers. The less common, highly technical qualifications do generally lead to higher levels of pay, but I expect this is more due to the more senior and technical positions (which the certificate may demonstrate one's capacity to fulfil) rather than the certification itself." Now, we don't have the room to provide a detailed summary of every certificate that's available, but here's a general overview:



A+

http://certification.comptia.org/a/default.aspx

The most widely known and probably most common of CompTIA's certificates is designed for those looking at becoming computer technicians. It covers some fairly basic material – such as installing, setting up, fixing and maintaining hardware and software. And, as the website says, it's vendor neutral. Forum regular tantryl wasn't overly impressed by it. "It wasn't expensive, but it personally wasn't worth it for me," he said. "I already had the kind of job this particularly low level qualification [can] get you. I didn't really learn anything I didn't already know, I just memorised



currently irrelevant things like what IRQs are used for what." He feels that A+ isn't worth it "unless you're a complete beginner."

Cisco Career Certifications

http://www.cisco.com/web/learning/index.html

There's a string of Cisco certifications out there for those who've got the interest, time, money and/or need – from the entry-level CCNA program right up to the Cisco Certified Internetwork Expert (CCIE) range. Obviously, they're all designed for those looking at getting into or moving further up the food chain in networking. As segger said, the entry-level certificates are really common, so if you're to stand out, you'll need some of the higher-level ones to your name. In general, the feedback in the thread was pretty positive. The only points that really stood out to us were these two raised by user Smiffdog. "My main disappointment is that Cisco is quite slow to update its content and often the 'Cisco answer' is the right answer instead of the correct answer in the real world."

Linux+

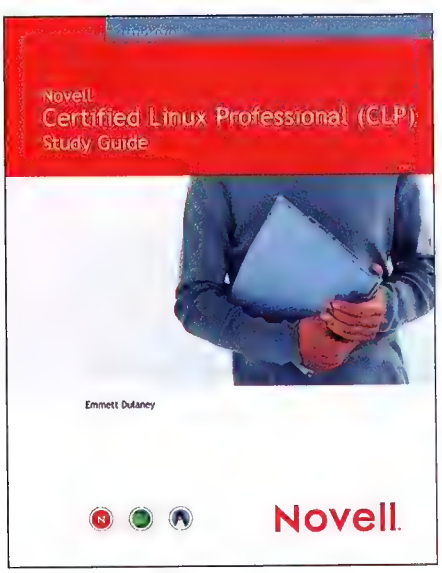
http://certification.comptia.org/linux/default.aspx

Another vendor neutral CompTIA ceritication, Linux+ gets into the nitty gritty of managing Linux systems, configuring software and managing servers and security. Leonid recommends it for those looking at becoming technicians.

Microsoft Certified Professional

http://www.microsoft.com/learning/mcp/default.mspx

As pointed out a couple of times in the thread, the MCP range of certificates are very Microsoft-centric. "I wouldn't consider these for general network administration unless you want training specifically to manage a Microsoft environment (and then you're talking server admin, not network admin)," said segger of the network-focused MCP offerings. Resident code monkey kikz, who's done both the MCAD and MCSD, said that "getting certified was a positive step and helped with [his] understanding of [his] chosen tool (the .NET





Framework)." He managed to do these on the cheap, though, by purchasing the books from Amazon and studying in his own time.

Novell Certified Linux Professional

http://www.novell.com/training/certinfo/clp/

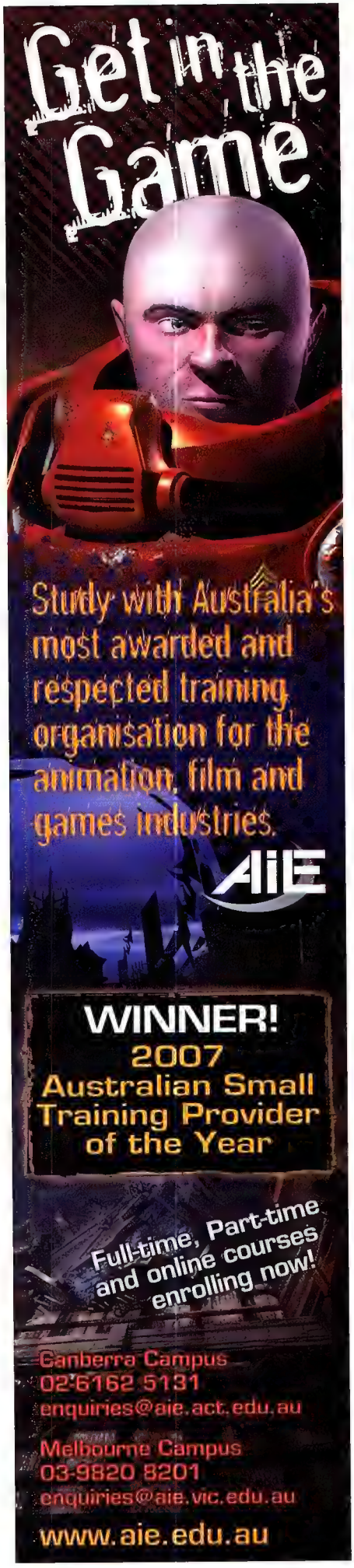
As the website says, this is all about gaining the "necessary skills to become a proficient Linux administrator". Worth noting is the fact that unlike CompTIA's Linux+, which favours no particular Linux distro, Novell's program focuses on SUSE. Leonid recommended it for those seeking employment as network admins.

VMware VCP

http://mylearn1.vmware.com/portals/certification/

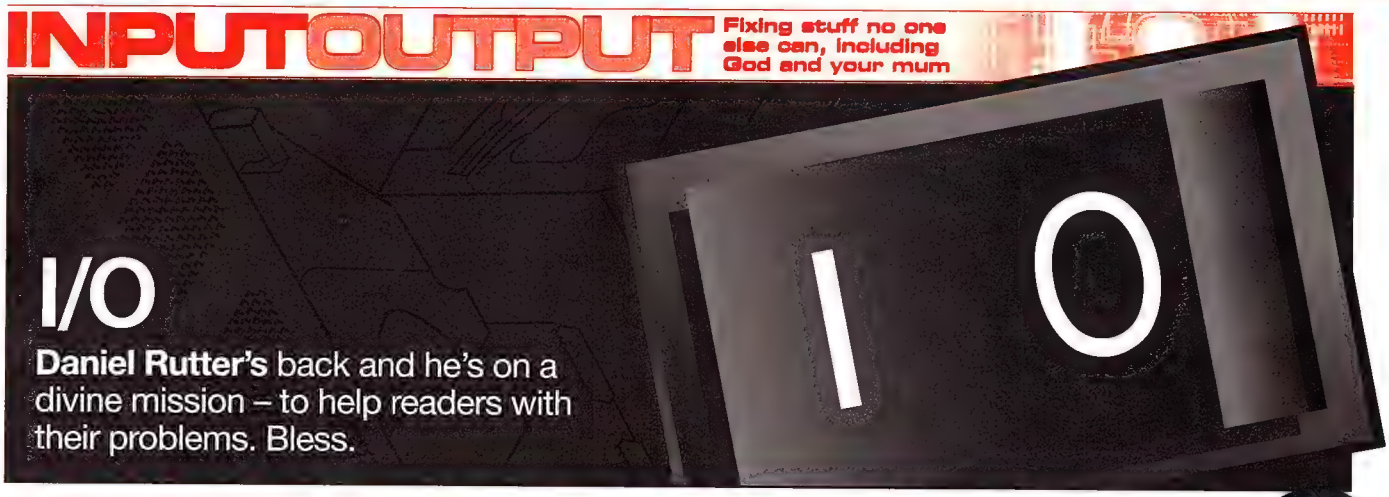
"The VCP wasn't worth the cost," said Leonid. The VMware Certified Professional Program, as the name suggests, covers the ins and outs of getting the most from VMware's virtual machine software. At the time of writing this article, Leonid was the only forum member to provide a review, so we can't claim to know much about its usefulness.

The Cisco and Microsoft certificates were, by far, the programs we received the most feedback on, simply because they're without a doubt the most popular. Whether one really needs them or not was the subject of much debate, but the general consensus is that they are merely there to complement a good degree and extensive real world experience. While CompTIA proudly offers vendor neutral qualifications, most of the certifications mentioned both in this article and the thread relate only to a single developer or product. Granted, some of the skills acquired through doing these programs can be applied elsewhere, but it's up to you whether you want to invest time and effort into something that's going to only be relevant to a small number of jobs. Of course, being an expert in a particularly obscure field can work out for you, as pointed out in these articles and on the forums in recent months. The economic cost of these courses may prove a turn-off too, although you'll find that some employers will be happy to pay. Plus, you always have the option of making like kikz and buying the books online and studying in your own time.



INPUTOUTPUT

Fixing stuff no one else can, including God and your mum



I/O

Daniel Rutter's back and he's on a divine mission – to help readers with their problems. Bless.

I/O OF THE MONTH

Clashing controllers

I purchased a Skymaster Serial ATA SIL 3112 controller card and need help from the manufacturer. Would you possibly have a contact email address for this manufacturer?

My computer has an Asus motherboard with onboard Nvidia RAID 0, and when I install this card with a single drive attached to it, at POST I get the following error – Not enough space to copy PCI Option ROM [00:08:00] – and my original onboard RAID disappears, even in the BIOS setup program! Plus, the computer tries to boot from the add-on card.

On the card there is a place where a jumper could go to change the add-on card to 'IDE Mode' (as opposed to RAID mode), but there are no pins to put a jumper on there. I wanted to ask Skymaster if I could modify the card by closing this jumper.

It may sound odd that I want to modify the card, but unfortunately computer components are not readily available here in Zimbabwe.

Mark

Yes, you certainly can connect the jumper pads on the board by soldering any old little bit of wire on there. I doubt it'll help, though. You probably are going to have to get a new controller card.

Fortunately, the going rate for SATA cards on eBay is now little more than $AU10 including delivery for something based on a Promise or Highpoint chip. So there must be some way for you to lay your hands on one, even in Zimbabwe.

Forget trying to contact 'Skymaster', though. Skymaster is just the name that some Australian distributor of cheap PC gear decided to slap on their products. There is no 'Skymaster factory'.

Because Skymaster is not a real company, though, there are no mysterious problems that're particular to its gear. If you buy hardware from some obscure little manufacturer who make their own weird firmware, you may have problems that nobody else has. That is not the case here, though.

When a PC starts up, it loads the 'option ROMs' for its basic hardware into memory. Those ROMs allow the system BIOS to deal with the basic hardware that's needed to start the computer – things like elementary video, keyboard input, and hard disk controllers.

When this rather prehistoric process happens, each necessary ROM is loaded into its own little spot in the first 640 kilobytes of memory. There's some flexibility to the ROM-loading process, so different pieces of hardware don't often step on each other. Each vehicle trying to find a place for itself in the low-memory parking lot has a range of parking spaces it can accept.

But it's still possible for two or more pieces of hardware to end up wanting the same parking space, especially if something in the system has dumb firmware that insists on reserving most of the parking lot for itself. Then, if the clashing pieces of hardware are hard disk controllers, you'll get the kind of problem you're having here.

'Not enough space to copy PCI Option ROM' is one such error message. 'Insufficient Memory to Shadow PCI ROM' is what an Intel-chipset board will say in the same situation.

Unfortunately, I don't think there's actually any way to make these two disk controllers play nicely.

But there's nothing special about the old Silicon Image 3112 – it's just a basic two-port SATA controller with the usual RAID 0 and 1 options that're mainly handled by the driver software. Since you're not even using the RAID functions, any SATA controller card at all will solve your problem.



If you search for 'skymaster', you find more aeroplanes than expansion cards.

I/O OTM wins a Logitech G5!

There's a mouse in the house. Okay, it's not in the house, it's in IO. And it looks damn good.



An incorrigible fiddler

I'm curious to know if there's a rule of thumb that I can use for determining when I should be changing the thermal grease on various heat sinks. The very nature of the stuff means that if I was to remove a heat sink to check whether it had dried out, I'd end up having to apply some more anyway. What's a reasonable interval?

Michael Shannon

If the goop was applied properly in the first place (a thin smear, not a big iced-doughnut blob), and if it hasn't degraded into uselessness, you don't need to replace it at all.

It's hard, as you say, to tell if thermal compound has degraded into uselessness without taking the heat sink off. If you simply have to look even though nothing's actually overheating, and all you find under the heat sink is a dusting of powder, you know that you need to put fresh goop on before you put the heat sink back on again.

But you don't know whether that dried-out compound wasn't still working perfectly well before you ruined everything by peeking.

All thermal compound has to do is fill the voids between the heat sink and the chip package. Dry compound can do that as well as wet, if it's filling the gaps and the heat sink isn't jiggling around. If a metal-loaded thermal goop has dried out completely, it may actually work better than it did when wet.

Thermal compound datasheets may or may not quote service life for the compound. If they do, it may only be for high temperature operation – though many thermal compound formulations will dry out after a few years even if the computer's never turned on.

One thing you can count on, though, is that letting dust into the junction area by taking the

heat sink off is bad news. Dust – and, even worse, hairs – will hold the heat sink and chip apart, making a considerable difference to thermal transfer.

It's even more important to make sure you haven't shed a hair onto the top of the CPU than it is to make sure you use a small amount of goop.

Golden goop

I read your informative article (http://www.dansdata.com/goop.htm) comparing heat transfer compounds. Have you tried gold leaf, typically found in craft and art supply stores and used for gilding and book embossing? I'd be interested to know your results.

Greg Threlfall

O I suspect gold would be surprisingly ineffective.

Even the flattest of surfaces have many tiny air voids between them when they're pressed together. Thermal goop has to fill those voids with something that has better thermal conductivity than air, and also has to stay out of the way in the rest of the contact area.

Just about anything has thermal conductivity much better than air (glass beats air by a factor of 44...), so just about anything that'll stay in the gap without decaying or flowing out will get the job done.

Gold's thermal conductivity is excellent. Copper's conductivity is about 1.25 times that of gold and aluminium is not that much worse, at about 0.75 times, but gold won't have much (if any) oxide on it and is very malleable. So in practical situations, 24 karat gold slugs on the tops of processors and the bottoms of heat sinks would probably work quite well, if they were affordable.

I suspect that just putting a thin layer of gold in between an ordinary CPU and heat sink, though, would create two problems.

One: The gold wouldn't flow out of the contact points where, with no thermal interface material at all, there would otherwise be metal-to-metal contact.

Two: The gold wouldn't fill the voids very well. The gold in the metal-to-metal contact areas would hold the two surfaces apart, so the voids wouldn't end up any better filled than they were without any interface material.

If you squished the heat sink around a bit on top of the processor after latching it on then you might get the gold to move out of the contact patches and into the gaps, but I suspect there wouldn't actually be enough pressure to get this to work properly. You'd actually get the shredded super-fine gold leaf building up in lumps in some places and leaving voids in others, like a big sheet of tissue paper being mashed around between two mattresses.

The result would be an even worse contact than if you'd used no interface material at all.

Interestingly, at least one company sells a 'liquid metal' thermal interface material, which is one of those pseudo mercury room temperature liquid alloys based on gallium and indium (plus, in this case, apparently rhodium, silver, zinc and tin – though I bet there's actually very little of those in there).

It doesn't seem that even this liquid metal works any better than conventional thermal goop, though: (http://tinyurl.com/2eo7vn)

This could have something to do with the fact that the thermal conductivities of gallium and indium are really lousy, though. Aluminium has a conductivity of 237 W/(m*K) at room temperature; gallium is 40.6 and indium is 81.8.

(And just in case you were wondering, mercury is only 8.3.)



▲ The thermal interface craze of 2008.

Getting bent

I What is your expert opinion on "SATA cables should not be bent 90 degrees"?

This is a problem I have faced with my PC and a lot of my tech support customers.

Torqu3e

O It's ridiculous to say that any kind of electrical cable must not ever turn by 90 degrees, though. That'd preclude your hard drives from ever being anywhere other than standing out perpendicular at the end of the cable; I presume you'd have to cable-tie the drive to a garden stake or something.

All sorts of cables do, however, have bend restrictions. If you kink a cable too hard you can fracture conductors (or optical fibres).

The bend restrictions always specify a radius, though. The minimum bend radius for Category 5/5E network cable, for instance, is usually specified as at least eight times the outside diameter of the cable, and possibly rather more. If you violate that by just yanking the wire around the edge of a ceiling joist when you're running cable through your roof, you may end up with a flaky connection.

I think the minimum bend radius for normal SATA cables (obviously, only in the direction in which these flat cables want to bend...) is 25mm, but I wouldn't bet my life on that. It's quite easy to kink a SATA cable worse than that if you're threading it between chassis members in a PC case.



▲ What could possibly go wrong?

FALLOUT

Funnies and humour from the fallout zone



The Jerk Effect

Logan Booker won't take no back talkin' from no one.

"I don't think you should shoot him," Ashley said

Garrus raised his hand in agreement. "I *really* don't think you should shoot him," he said.

Commander Shepard, humanity's greatest space marine and supposed shining beacon of virtue, nodded sagely at their advice, before nonchalantly pulling the trigger of his Kessler pistol.

There was a noise, like someone dropping an air conditioner on a custard tart. Then, a slumping sound.

Ashley gasped. "You shot him."

Shepard had no idea what a sarcastic nod looked like, but he managed to pull one off. "Excellent point, well made. Now, what are we doing next?"

Garrus took a deep breath before responding. "We have to meet a quarian diplomat in Alpha Centari. We have to deliver-"

"A bullet," Shepard suggested.

"No…" Garrus stifled a sigh. "Documents. Important documents regarding fleet arrangements for the upcoming engagement against the geth."

"Those are the robot dudes, right?" Shepard asked.

Ashley and Garrus looked at each other briefly before nodding in unison. Ashley wasn't totally committed however – she was trying to ignore the slowly cooling body of the taurian diplomat at her feet.

"We'll be out of here soon, Ash, don't you worry your pretty head." It was meant to calm her, but she just gave Shepard a look that said dirty in ten different ways.

"Um, Shepard?"

"Yes Garrus?"

"I don't, uh…" Shepard could see he was uncomfortable. "I don't suppose, when we met the quarian diplomat, you might refrain from… maybe just this time, to start with, shooting him in the face?"

Shepard tried not to laugh. "Where'd the fun be in that?"

Ashley cut in. "I didn't realise saving the known galaxy was meant to be 'fun', Commander," she seethed. "Of great importance yes, perhaps a bit out of our way, but certainly not a rollercoaster made of pure excitement; or anything rollercoaster-shaped."

"What's a rollercoaster?" It was Garrus.

"Oh, it's just something you ride. It's supposed to be scary and fun at the same time."

"Like driving in a tractor with your blind uncle?"

Ashley was not impressed. "A bit like that, yes."

"All I'm saying," said Garrus, "is that it might be nice if we could deliver the documents to the diplomat *before* you shoot him. Actually, if we could just skip the whole shooting part, I think the process would go a lot smoother."

"But it's not a rollercoaster that way Garrus."

"I realise that, but this way we'll get paid. I happen to like money."

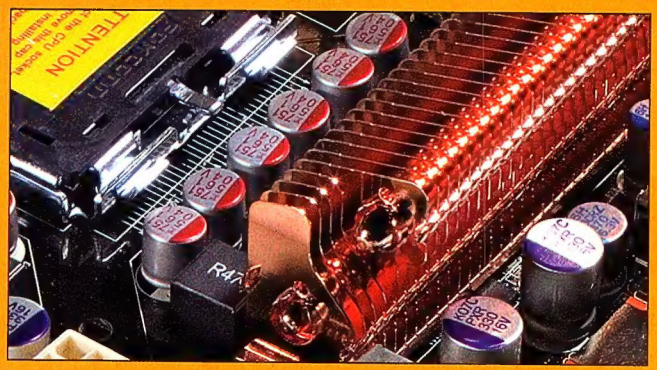
"So do I," said Ashley.

"Can't we just shoot the diplomat and take his money?" Shepard asked.

A sigh finally escaped from Garrus. "I have no idea why the council made you a Spectre, Shepard. At this rate, we'll be broke, despised and ridiculed before the end of the week."

Shepard smiled. "I was aiming for the end of the day, but I'm happy to draw it out."

NEXT MONTH



MOBO GUIDE

Josh Collins takes us through what to look for in the perfect enthusiast motherboard.

HD WARS

Jake Carrol runs the numbers on Blu-Ray and HD-DVD, looking at the hardware, the tech, and the benefits. Find out which format is the best for you!

TOOL TIME

An in depth tutorial on getting the right tools for any modding job, from how to use them to how to store them - safely!

MEMORY TIMINGS

It's a tweaker's paradise as Josh continues his hardcore warpath, this time with a guide to getting the most from your RAM.

PowerColor



Invincible 3D Graphics for HD Gamers

PowerColor HD3870

- 775MHz/1.126GHz
- 512MB GDDR4/256bit Memory
- Microsoft DirectX 10.1
- CrossFireX™ Support
- ATI PowerPlay™ Techology
- Daul DVI +TVO
- PCI Express 2.0 interface
- Windows Vista Support

PowerColor HD3850 PCS

- 720MHz/900MHz
- 512MB GDDR3/256bit Memory
- Microsoft DirectX 10.1
- CrossFireX™ Support
- ATI PowerPlay™ Techology
- Dual DVI + TVO
- PCI Express 2.0 interface
- Windows Vista Support

PowerColor HD3850

- 668MHz/828MHz
- 256MB GDDR3/256bit Memory
- Microsoft DirectX 10.1
- CrossFireX™ Support
- ATI PowerPlay™ Techology
- Dual DVI + TVO
- PCI Express 2.0 interface
- Windows Vista Support

ATI CROSSFIRE X TECHNOLOGY

ATI RADEON GRAPHICS

Australia IT

Australia I.T. Pty Ltd
+613 9560 3188 (Melbourne)
+612 9643 1388 (Sydney)
www.australiait.com.au

Available at
www.auspcmarket.com.au
www.i-tech.com.au
www.scorptec.com.au
www.skycomp.com.au
www.umart.com.au
www.techbuy.com.au

TUL™ **TUL Corporation**
www.tul.com.tw

CORSAIR™

200m Water resistant

Durable

Anti-shock

Plug-and-Play

At least your data will survive...



Flash Survivor GT

- Designed for speed 34MB/s read - 28MB/s write
- Performance IC-paired memory and controllers
- Encased in extremely strong CNC-milled 6061 Type 2 aluminum
- Water resistant to 200M through the use of EPDM waterproof seal
- 10 Year warranty

Flash Survivor

- Encased in extremely strong CNC-milled 6061 Type 2 aluminum
- Water resistant to 200M through the use of EPDM waterproof seal
- 10 Year warranty

Flash Voyager GT

- Designed for speed 34MB/s read - 28MB/s write
- Performance IC-paired memory and controllers
- Shock and water resistant rubber housing protects your data
- 10 Year warranty

Flash Voyager

- Performance IC-paired memory and controllers
- Shock and water resistant rubber housing protects your data
- 10 Year warranty

– even if you dont!

ALTECH COMPUTERS

WWW.ALTECH.COM.AU

SYD (02) 8831 9999 sales-syd@altech.com.au
MEL (03) 9558 5090 sales-mel@altech.com.au
BRIS (07) 3017 2000 sales-bris@altech.com.au
PER (08) 9242 8822 sales-wa@altech.com.au

NSW	AusPCMarket	02 9646 8000	www.auspcmarket.com.au	Techbuy Pty Ltd	02 9648 1818	www.techbuy.com.au
	Umart International P/L	02 9745 0877	www.umart.net	Jess World Ptd Ltd	02 9630 9630	www.itestate.com.au
VIC	PC Case Gear	03 9584 7266	www.pccasegear.com	Scorpion Technology	1300 726 770	www.scorptec.com.au
SA	Allneeds Computers	08 8211 8661	www.allneeds.com.au	Getright International	08 8362 0622	www.getright.com.au
WA	Netplus Micro Computer	08 92427288	www.netplus.com.au	PLE Computers	08 9309 4771	www.ple.com.au
QLD	Umart Online	07 3369 3928	www.umart.com.au	PC Shopper	07 3397 0777	www.pcshopper.com.au
	Custom Computer Services	07 5493 8277	www.ccscomputers.com.au	Game Dude Pty Ltd	07 3387 1500	www.gamedude.com.au
TAS	Office Equipment Warehouse P/L	03 6272 6272	www.oewcomputer.com	Taspro Computers	03 6424 1911	www.taspro.com.au

TOMORROW'S TECHNOLOGIES — TODAY!